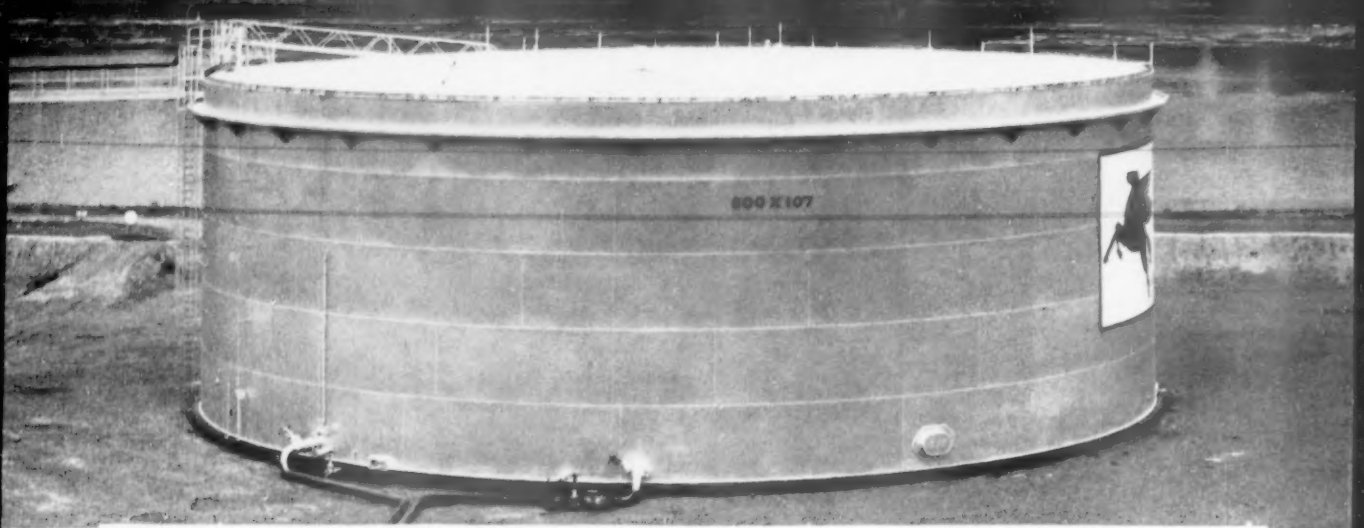
the OIL AND GAS JOURNAL

B&J
ELEVATORS
for drill pipe, casing and tubing

PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 APRIL 12, 1954

FIRST CHOICE

HORTON DOUBLE-DECK FLOATING ROOF



Horton® Double-Deck Floating Roofs, like the one in this 80,000-bbl. welded steel tank built for General Petroleum Corporation at Portland, Oregon, are the first choice of the petroleum industry to provide dependable, efficient, economical storage for volatile petroleum products. Throughout the industry today, storage tanks with Horton Floating Roofs are reducing evaporation loss, corrosion and fire hazard. Horton Floating Roofs are particularly recommended for working tanks that are filled and emptied frequently.

How the Double-Deck Floating Roof Works

Floating directly on the surface, the entire bottom of a Horton Double-Deck Floating Roof is normally in contact with the liquid in the tank. There is no space above the liquid for air-vapor mixture to form. All loss caused by filling and emptying is eliminated. Fire hazard is reduced and corrosion of the tank and roof is minimized.

Horton Seal

Standard construction on all Horton Floating Roofs is the very effective Horton Seal. This device closes the space between the deck of the roof and the shell of the tank. Vertical flexures every 22 inches allow the sealing ring to expand and contract enough to conform to the inside of the tank shell. Pantagraph hangers support the sealing ring and keep the roof centered at all times. A gastight, flexible fabric closes the space between the top of the sealing ring and the deck of the floating roof to complete the seal.

Further information or quotations on Horton Double-Deck Floating Roofs may be had by writing our nearest office. There is no obligation on your part.

CHICAGO BRIDGE & IRON COMPANY

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Atlanta, 3 ..... 2184 Healey Bldg.
Birmingham, 1 ..... 1836 North 19th St.
Boston, 10 ..... 201 Devonshire St.
Chicago, 4 ..... 2170 McCormick Bldg.
Cleveland, 15 ..... 1201 Midland Bldg.
Detroit, 26 ..... 1314 Lafayette Bldg.
Houston, 2 ..... 315 C & I Life Bldg.
Los Angeles, 17 ..... 1823 General Petroleum Bldg.
New York, 6 ..... 3347—165 Broadway Bldg.
Philadelphia, 3 ..... 1615—1700 Walnut Street Bldg.
Pittsburgh, 19 ..... 1228 Alcoa Bldg.
Salt Lake City, 4 ..... 525 West 17th South St.
San Francisco, 4 ..... 1554—205 Bush St.
Seattle, 1 ..... 1325 Henry Bldg.
Tulsa, 3 ..... 1606 Hunt Bldg.

REPRESENTATIVES AND LICENSEES

Horton Steel Works Limited, Fort Erie, Ontario, Canada
Ateliers et Chantiers de la Seine Maritime, Paris, France
Constructions Metalliques de Provence, Arles-sur-Rhone, France
Chicago Bridge & Iron Company, Lake Asphalt, Caracas, Venezuela
Sociedade Chicago de Construcoes Ltda., Av. General Justo, 275, Grupo 306, Rio de Janeiro, Brazil
Compagnie N. V. 21, Aartsel, Amsterdam (C) Netherlands
Compagnia Tecnica Industrie Petroli, Rome, Italy
Whessoe Limited, Darlington, England
Motherwell Bridge & Redpath and Company, Limited, Motherwell, Scotland

the OIL AND GAS JOURNAL

APRIL 12, 1954 VOL. 52 NO. 49

OIL IN THE NEWS . . .

Huge Unitization Project Proposed for Levelland Field 92
Independents Reverse Stand, Back Import Tax at TIPRO Meet 93
TIPRO Reluctant, but Endorses State Controlled Gas Prices 94
Texas Senate Ups Natural-Gas Production Tax; Final OK Seen 95
Big Secondary-Recovery Projects Before Railroad Commission 96
Earthen Fills Mean More Drilling Sites on Lake Texoma 97
Tanker Designed for Liquid Chemicals Goes Into Service 98
California Standard Completes Sespe Ranch Discovery 100
House Committee Cuts Funds for Oil and Gas Division 101
Douglas Starts Drive for Federal Control of Tidelands 103
A.P.I. Refining Division Meets in Houston May 10-13 104
Humble Offers 90.5 Per Cent Royalty for Texas Tract 105
Companies Join in Gulf Exploration Venture 105
Union Discovery Opens Major New South Louisiana Field 106
Esso Export, California Transport Contract for Brazil Crude 108
Indian Discovery Put on Regular Production 111
Two More Rigs Ordered for Australian Drilling 111
Hoover Paves Way for Final Negotiations in Teheran 113
Australasian Plans 1954 Outlay of $5,600,000 in New Guinea 113

NEWS FEATURES . . .

They Say 75
Calendar of Events 81
Journally Speaking 87
Editorial 89
This Week 91
Watching Washington 103
International News 108
Personals 115
Deaths in the Industry 117
Refining News 184
Petrochemical News 185
Natural-Gas News 186
Pipeline News 191
Statistical Summary 215
Drilling Statistics 216
Supply Statistics 217
Refining Statistics 218
Demand Statistics 219
Selected Monthly Statistics 220

TECHNOLOGY AND OPERATION . . .

[1]Increased Efficiency at Pipeline Pump Stations 118
By R. G. Deering
Treating Gasoline by Dualayer Process 122
By C. A. Duval and V. A. Kalichevsky
[2]Unitized Production is Economical Production 125
By Ed McGhee
[3]Instrumentation for Precise Fractionation 127
By D. J. Bergman
[4]How Mud Properties Affect Drilling Rate 131
By John R. Eckel
Ultraforming—Low-Pressure Cat Reforming 139
Progress Report: Natchez, Miss., Oil Production 144
By G. W. Gulmon and H. E. Hansen
TV—New Industrial Tool 151
By Bertram F. Linz
Pipeline Patrol: Plastic Coating a Pipeline 153
Engineering Reference Section 159-168

DEPARTMENTS . . .

Pipeline Patrol 153
On the Job 157
Engineering Reference 159
Instruments 161
Progress in Metals 163
Field Processing 165
Refiner's Notebook 167
Engineering Fundamentals 168
Equipment Men in News 169-224
Equipment Digest 177
Trade Literature 181
Classified Advertising 222
Advertisers' Index 225

EXPLORATION . . .

Instrument X . . . Myth or Miracle 195
Cambrian Holds Bright Promise in West Texas 196

FIELDS . . .

Drilling Contractors 188
Area Field Reports 199

In Brief . . .

1. INCREASED EFFICIENCY . . . A pneumatic control system, recently installed by Texas Empire Pipe Line at its Patoka, Ill., crude-oil pump station, has increased the pipeline load factor and raised the station operating efficiency. This control system accurately adjusts diesel-engine speed to meet pipeline load requirements. In addition, it provides features which cause engines to shut down automatically in case of emergency.

2. ECONOMICAL PRODUCTION . . . A number of surface benefits may be realized from unitization, as shown by the SWAGSU unit of Garvin County, Oklahoma. Before unitization of the field, there were 199 individual lease tank batteries; now there are only 12. Before, pumper labor and travel expense from battery to battery was high; now, after unitization, pumper labor is more efficient, and travel expense is far less. Before unitization, gas was flared at some batteries; now no gas is flared.

3. PRECISE FRACTIONATION . . . In the precise fractionation of benzene from toluene and xylene, high benzene quality may be maintained by utilizing a temperature differential measuring element to position a flow controller on the column reflux. A differential vapor-pressure measuring element may also be used successfully. In either case the measuring element should be located across a tray in the rectifying section, somewhat below the top tray, at a point of appreciable temperature gradient across the selected tray.

4. FASTER DRILLING . . . Mud properties may be varied to bring about faster drilling. Effect of mud properties on drilling rate may be summarized as follows: (1) decrease in fluid density will increase drilling rate; (2) increased rates of drilling are obtained when using oil-emulsion muds, due to the lubricating properties of these muds; (3) since a rotary drilling rig is essentially a maximum hydraulic horsepower device, system losses can be decreased and drilling rates can be increased if viscosity and density are decreased; and (4) drilling rate increases as cleaning effect of the mud is increased.

You get far more service per horsepower dollar from Stewart & Stevenson...

Here's Why:

There's an axiom about engines, proved in thousands of installations: *Engines are no better than the parts and service organization behind them.* When you deal with Stewart & Stevenson, you get these definite advantages that assure you far more service per horsepower dollar: (1) You get an impartial evaluation of your power needs, whether your job is best suited for gas, diesel, gasoline or butane; (2) You get the benefits of the finest products; (3) You get a turn-key job with undivided responsibility, backed up by a standard manufacturer's warranty, plus the Stewart & Stevenson guarantee of duty; (4) You get all the facilities of the Nation's largest diesel engine parts and service organization; (5) You get the advantage of experience gained in thousands of engine applications under every operating condition.

Let us talk to you about your power requirements. Call the branch nearest you today.

GM DIESEL POWER

CHRYSLER

climax

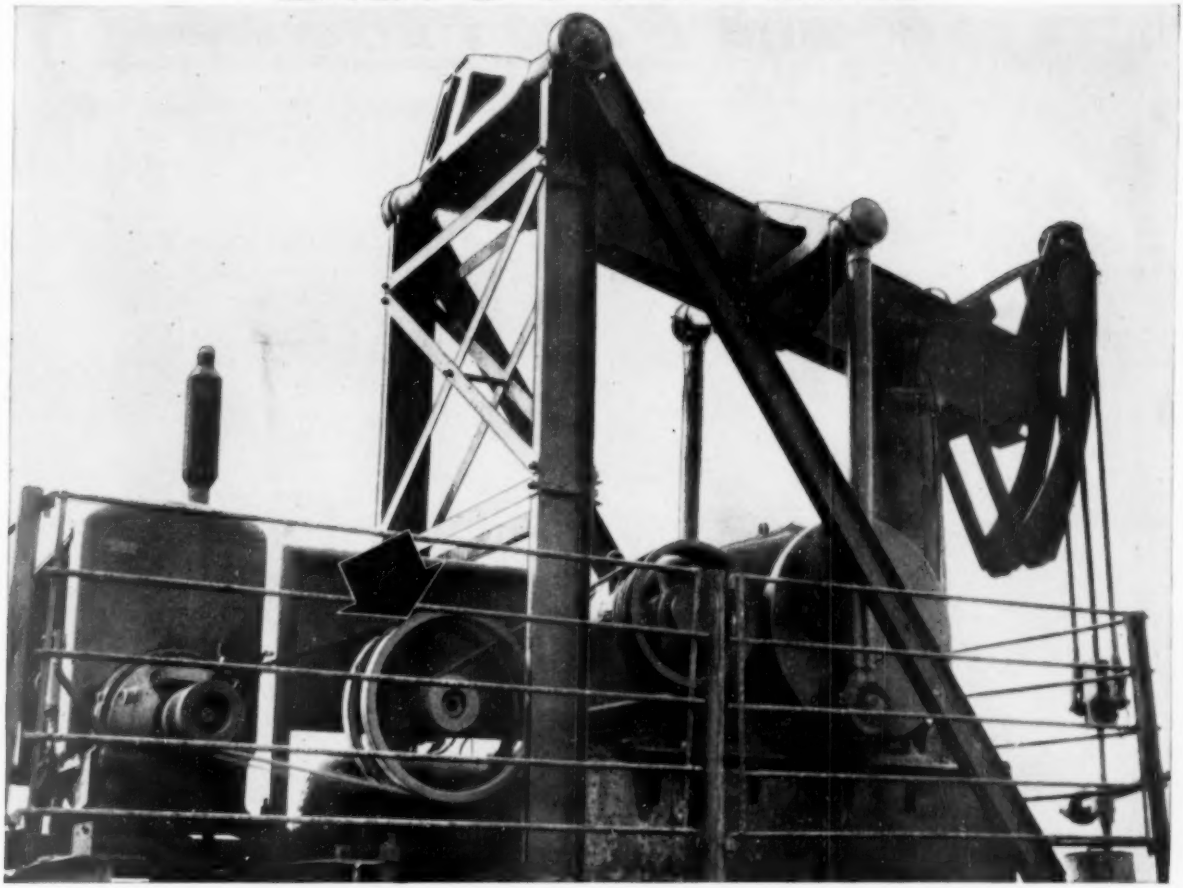
THE NATION'S LARGEST DISTRIBUTORS OF GM DIESEL ENGINES

STEWART & STEVENSON SERVICES, INC.

Main Office and Plant:	4516 Harrisburg Blvd., Houston 11, Texas. Phone WOodcrest 9691
Branches:	Corpus Christi, Dallas, Lubbock, Wichita Falls, San Juan , Odessa.
Representatives:	San Antonio, Longview, Brownsville.
Distributors of:	General Motors, Diesel Engines, Climax Blue Streak Engines, Chrysler Industrial and Marine Engines, Chicago Pneumatic Engines, Petter Diesel Engines.
Fabricators of:	Electric Power Units, Electrical Control Equipment, Portable Pumping Units, Truck Bodies, Red Head Pumps.

PARTS • SERVICE
STEWART & STEVENSON SERVICES
ANYTIME • ANYWHERE

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Belt service tripled with B. F. Goodrich Grommet belts

Grommet V belts last longer; cost no more than ordinary belts

WHEN ordinary belts were used to run that oil pump, they wore out in six weeks or less—some lasted only 3 days! They couldn't take exposure to weather, oil, or stand the weight of the 160-pound floating pulley (see arrow). The well is a "sander", so when the pump stops working, the whole pumping mechanism has to be pulled from the 3000-foot well, cleaned, and put back.

The oil company tested practically every make of V belt, but none solved the problem until they tried a set of B. F. Goodrich Grommet belts. Instead of giving just 3 days' or 6 weeks' service, the Grommet V belts were still on the job after *six months*, still going strong. B. F. Goodrich belts are now used almost exclusively on this oil lease. Here's why Grommet belts outlast and outperform other V belts:

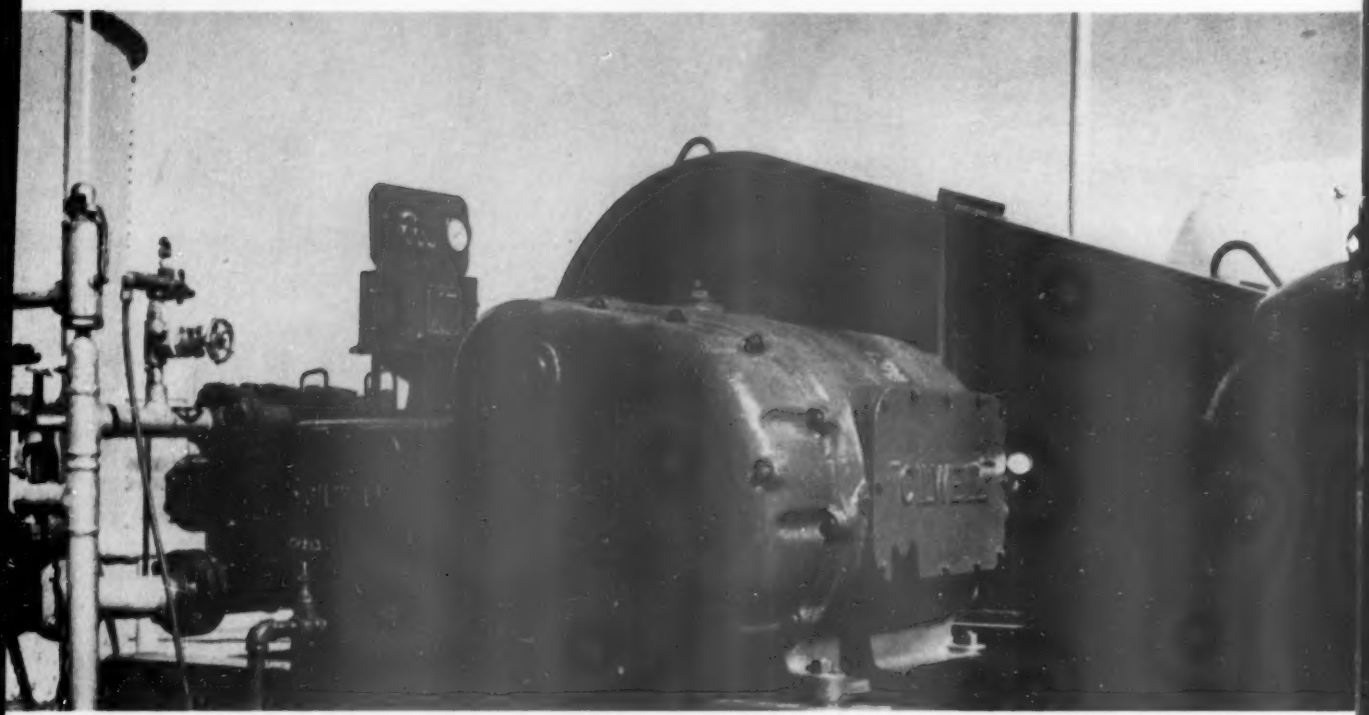
In Grommet belts, all the load-carrying cords are concentrated in twin grommets. A grommet is like a giant twisted cable except that it's endless. Since there are no center cords, the Grommet belt is more flexible, and so can "give" temporarily and absorb shock loads. And there are no overlapping cord *sections* as in all ordinary belts—no weak spots to cause premature belt failure. As a result, Grommet belts last 20 to 50% longer, depending on the service. (The tougher the service, the greater the increase over ordinary belts.)

If you're getting short service from your belts, try a set of the longer-lasting Grommet belts, and see the difference. You'll find these BFG V belts at leading supply houses in the oil field, or at any one of these B. F. Goodrich warehouses: Beaumont, Dallas, Fort Worth, Hobbs, Houston, Odessa, Wichita Falls, Great Bend, Oklahoma City, Tulsa, Williston, Denver and Los Angeles. *The B. F. Goodrich Company, Dept. M-224, Akron 18, Ohio.*

Grommet—T.M. The B.F. Goodrich Co.

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

What does SLOWER SPEED have to do with Pump Performance?



IT IS GENERALLY RECOGNIZED that the useful life of machinery is related to the speed at which it operates. As speeds increase, maintenance expense and down time also go up.

This is particularly true in connection with the operation of fluid-injection pumps on secondary recovery projects. Over and above the additional expense of replacement items, interruptions in service may have a costly effect upon the ultimate recovery of the project.

That's why "Oilwell" offers Horizontal Triplex Pumps to operate at 185 rpm for fluid-injection applications

Compare the pressure-volume output of "Oilwell's" 6-in. stroke triplex at 180 rpm with corresponding data on 5-in. stroke triplex pumps operating at 360 rpm. We believe you will agree with the following:

AT 180 RPM . . . each of the six valves is closing against its respective seat *3 times per second* and each of the three plungers will be traveling through its stuffing box packing and oil seals at a rate of *180 feet per minute* with reciprocating parts reversing *6 times per second.*

AT 360 RPM . . . valves will close against their seats *6 times per second* and plunger travel speeds will have increased to *300 feet per minute* with reciprocating part reversals occurring at a rate of *12 times per second.*

Check this chart . . and see the wide range of pressures and capacities you can get with "Oilwell" No. 326-P, No. 36-P and No. 46-P pumps.

DISPLACEMENT AND HORSEPOWER REQUIREMENTS

Pump No.	Plunger Size Inches	Maximum Working Pressure psi.	DISPLACEMENT Barrels per Day at Pump Speeds (rpm) of						
			80	100	120	140	160	180	185
326-P	1½	5650	380	475	570	665	760	855	878
	1¾	4150	518	648	778	907	1037	1167	1200
	2	3180	667	835	1002	1168	1335	1502	1543
36-P	2¼	2520	852	1064	1277	1490	1703	1915	1970
	2½	2040	1048	1310	1570	1835	2095	2360	2420
	2¾	1680	1270	1587	1905	2220	2540	2860	2930
	3	1420	1510	1890	2265	2645	3020	3400	3495
46-P	3¼	1200	1770	2215	2660	3100	3540	3985	4090
	3½	1040	2055	2565	3080	3590	4110	4620	4750
	4	795	2680	3355	4025	4695	5365	6040	6205
	4½	630	3900	4250	5100	5950	6800	7645	7860
Brake Horsepower Required			43	54	64	75	86	97	100

With the right combination of VOLUME and PRESSURE at SLOWER SPEED, "Oilwell" Triplex Plunger Pumps cost LESS TO BUY and LESS TO OPERATE.

OIL WELL SUPPLY
DIVISION
UNITED STATES STEEL CORPORATION

Executive Offices—DALLAS, TEXAS
Export Office—
30 ROCKEFELLER PLAZA
NEW YORK 20, N. Y.

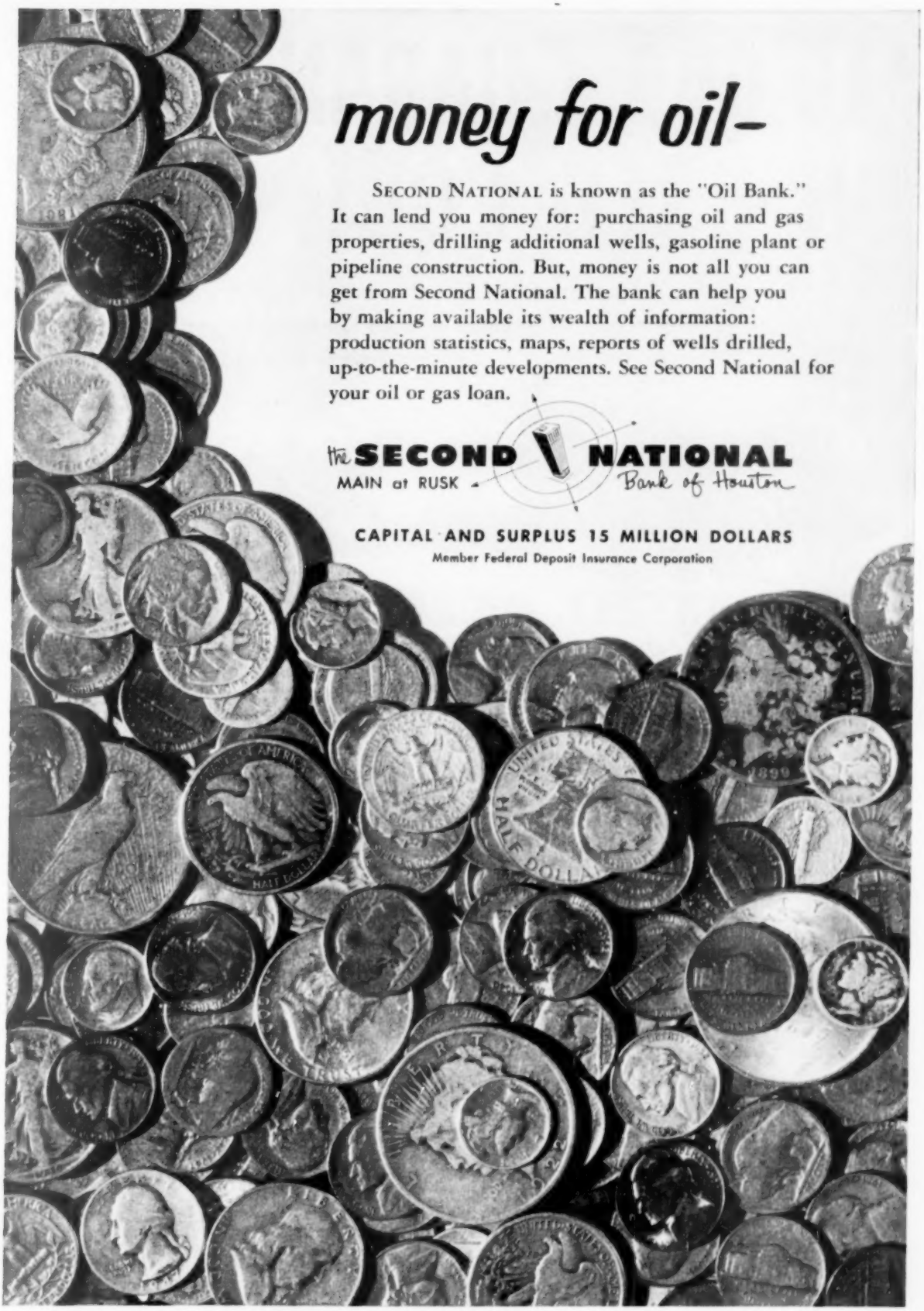
Area Offices — CALGARY, CANADA
CASPER, WYOMING . . . COLUMBUS, O.
DALLAS, TEXAS . . . HOUSTON, TEXAS
TULSA, OKLA. . . . LOS ANGELES, CALIF.

Branches Serving All Oil Fields

USS TRADE MARK

"OILWELL" TRADE MARK

UNITED STATES STEEL



money for oil–

SECOND NATIONAL is known as the "Oil Bank." It can lend you money for: purchasing oil and gas properties, drilling additional wells, gasoline plant or pipeline construction. But, money is not all you can get from Second National. The bank can help you by making available its wealth of information: production statistics, maps, reports of wells drilled, up-to-the-minute developments. See Second National for your oil or gas loan.

the SECOND NATIONAL
MAIN at RUSK — Bank of Houston

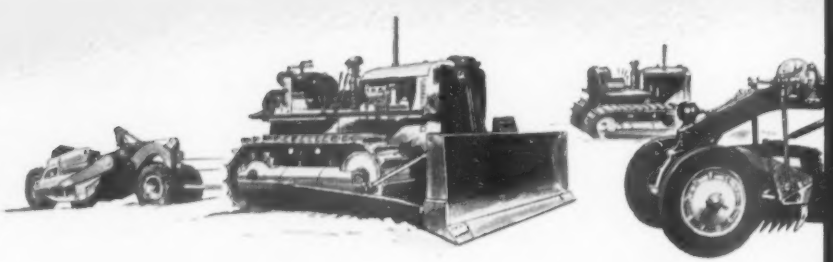
CAPITAL AND SURPLUS 15 MILLION DOLLARS
Member Federal Deposit Insurance Corporation

The Oil and Gas Journal, published Mondays, copyright 1954, by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $4 yearly

ANNOUNCING A

$10,000 GUARANTEE ON USED EQUIPMENT!

Never before a guarantee like this! Only your CATERPILLAR DEALER offers a "BONDED BUY" on used Caterpillar-built equipment backed by a bond of $10,000.



Your Caterpillar Dealer now offers you a "BONDED BUY" on used Caterpillar-built equipment backed by a bond of $10,000, issued by The Travelers Indemnity Company. He gives you this protection when you purchase a "BONDED BUY" machine.

This is the *first* time in the heavy-duty machinery field that such an offer has ever been made!

You are also offered two other classes of used equipment buys—"Certified Buy" and "Buy and Try." These cover used units of *any* make.

What does this mean to you? *It takes the guess and gamble out of buying used equipment.* You know what you're getting. Your assurance is in writing. What's more, *no matter what your needs, cost-wise or work-wise,* you have a *choice* to meet them.

Only your *Caterpillar Dealer* offers you this across-the-board selection. The best source of new machines, he's also your best source of used machines. Whether you're in the market for one, a few or many, he's the man to see for your *best* buy. See him today for complete details on guaranteed used machines!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

DON'T GUESS OR GAMBLE ON USED EQUIPMENT

You KNOW what you're getting at your CATERPILLAR DEALER

Your Caterpillar Dealer offers you three clear-cut classes of used equipment. He backs each one in writing. You buy with confidence, sure that the equipment is honestly described. See him for the best values on the market!

(1) "BONDED BUY" Only the best in used Caterpillar-built equipment. Each "BONDED BUY" machine is backed by a Dealer's Guarantee Bond equal to the purchase price of the machine up to a maximum of $10,000. This provides a guarantee for thirty days against unsatisfactory performance due to defective parts. If a part should prove defective within the guarantee period under the normal conditions of your job and with proper maintenance, your dealer will put your machine back into operating condition *with no charge to you for parts and labor* up to the amount of the bond. The Dealer's Guarantee Bond is backed by The Travelers Indemnity Company. Your Caterpillar Dealer gives you this protection with your purchase of a "BONDED BUY" machine. Look for the "BONDED BUY" symbol—it's your assurance of the best in used equipment.

(2) "CERTIFIED BUY" Next best buy in used equipment! "Certified Buy" covers machines of any make in good condition. Your performance guarantee is in writing backed by your Caterpillar Dealer.

(3) "BUY AND TRY" Bargains in used machines of any make. Buy and try them for a period mutually agreed upon by you and your Caterpillar Dealer. Each "Buy and Try" machine carries his written "money-back" agreement.

"BONDED BUY" assurance effective in the United States

CATERPILLAR

REG. U. S. PAT. OFF.

BEST BUYS IN NEW AND USED EQUIPMENT

DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

Copr. 1954, C. T. Co.

HALLIBURTON'S S-3 CASING CENTRALIZER

Keyseats, tight spots, extreme deviation – these are the hole conditions that make it rough on casing, tough on centralizers. But these are the exact conditions that proved the Halliburton S-3 Centralizer was best for rugged duty . . . naturally better for any job. The important combination of special steel springs and Halliburton design is the reason why you get the all-around protection and more positive centering for a uniform, long-lasting cement job.

Torture testing proved the superior stamina of the heavy steel springs. Loss of bowed-height after permanent set was considerably less than in ordinary centralizers – actually as low as 3.94%. Field use confirmed that each spring does more, making it possible to use fewer centralizers and still get more centering force. That means extra benefits in freer annulus circulation, faster installation and overall economy.

Exclusive design added new efficiency and strength. Springs are lap-welded to hinge-type end band for greatest protection against breakage. With load point on the bands and ample clearance between casing and end bands, the S-3 produces *less drag on rotating casing than any other centralizer on the market.*

Take advantage of the S-3 advantages – there are many more important features – on your next job. You'll find there is more positive centering force for any job, even for the tough ones. Phone your local or district Halliburton office.

Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HELPFUL, NEW INFORMATION

Write today for your free copy of this new booklet. There are helpful spacing guide charts and additional information on the S-3 Centralizer.

HALLIBURTON

CEMENTING SERVICES

THERE'S NO SUBSTITUTE FOR EXPERIENCE IN OIL WELL CEMENTING

"For over twelve years,

the U.S. Rubber Company..."

HARRY E. HUMPHREYS, Jr.
President,
United States Rubber Company

"For over twelve years the United States Rubber Company has offered its employees the Payroll Savings Plan, whereby they can systematically and regularly save in United States Savings Bonds. Over those years, tens of thousands of our employees have joined the Payroll Savings Plan with direct benefits to themselves and their families. Such employees are better employees because with more personal security and freedom from economic worry, there is less absenteeism and personnel turnover, fewer accidents and greater employee responsibility. Such regular investment in Bonds contributes also to the economic strength of the nation. By thus promoting a sounder dollar, business also directly benefits itself. That's why we at United States Rubber endorse the Payroll Savings Plan for Savings Bonds."

Mr. Humphreys cites three important benefits of the Payroll Savings Plan: Payroll Savers build personal security ... production curves reflect serious-minded workers and reduced absenteeism ... the national economy is strengthened by a growing reservoir of future purchasing power—more than 49 billion dollars in U. S. Savings Bonds, *cash value*, held by individuals.

There is still another big advantage in the Payroll Savings Plan: it is easy to install and maintain.

If you do not have the Payroll Savings Plan, or if you have the Plan and your employee participation is less than 60%, here's all you have to do to help your employees, your company and the country:

Write today to Savings Bond Division, U. S. Treasury Department, Washington, D. C. Tell them you want to join the United States Rubber Company and the 45,000 other companies that are making an important contribution to national security and a sounder dollar.

Your State Director, U. S. Savings Bond Division, will contact you promptly. He will explain the simple procedure of installing the Plan and will show you how to conduct a simple, person-to-person canvass that will put a Payroll Savings Application Blank in the hands of every man and woman in your plant and offices.

That's all you have to do. Your employees will do the rest. They are as interested in their own future as you are in yours. Give them an opportunity to build personal security for themselves and a better America for their children.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

THE OIL AND GAS JOURNAL
TULSA 1, OKLAHOMA

47%
or
$9,430.07

Saved.... IN PREMIUMS

What
POLICYHOLDERS
Say

This is one of many testimonial letters received from policyholders of the Texas Employers Insurance Association.

Ask the Texas Employers representative nearest you to show you more of these letters, as proof of what Texas' largest writer of Workmen's Compensation Insurance can do for you.

40TH ANNIVERSARY 1914-1954

WE QUOTE FROM A POLICYHOLDER'S LETTER:

"We wish to acknowledge the receipt of your dividend check in the amount of $7,178.57 which was recently delivered to us by your representative. This check along with the Guaranteed Cost Discount of $2,251.50 makes a total saving on the Standard Premium of $9,430.07 or 47.69% of the total Workmen's Compensation Premium paid by us for the period 1-1-52 to 2-1-53.

"We feel that this saving was brought about by the interest of our management and employees in accident prevention work and the cooperation and service rendered by your sales, engineering and claims departments."

Largest Writer of WORKMEN'S COMPENSATION INSURANCE *in Texas*

HOMER R. MITCHELL, *Chairman of the Board* A. F. ALLEN, *President*

Service Offices: ABILENE • AMARILLO • AUSTIN • BEAUMONT • CORPUS CHRISTI • DALLAS • EL PASO FORT WORTH • FREEPORT • GALVESTON • HARLINGEN • HOUSTON • LUBBOCK • MIDLAND ODESSA • PORT ARTHUR • SAN ANGELO • SAN ANTONIO • SHERMAN • TYLER • WACO • WICHITA FALLS

TEXAS EMPLOYERS INSURANCE ASSOCIATION
HOME OFFICE - DALLAS, TEXAS

A Spanish milled dollar — widely circulated in the U. S. in the 1870's. Write to The Bank for a copy of the folder, **TIMOTHY PICKERING, COLONIAL COIN-CLIPPER**, relating a little-known incident in the early history of the nation's money.

Yesterday and Today...

A Bank for Business

Seasoned in years and experience, and alert to the banking needs of modern business . . . this description summarizes our position in the national financial scene. Today, we transact business in each of the 48 states and finance foreign trade throughout the world, serving industry and individuals in a wide variety of capacities.

Our Commercial Department, as well as our Trust and Investment Counsel Departments, is ready to meet your needs with promptness, skill and dependability. Whatever your financial problem, we suggest that you investigate the up-to-date services of New York's oldest bank, founded in 1784 by business men for business men.

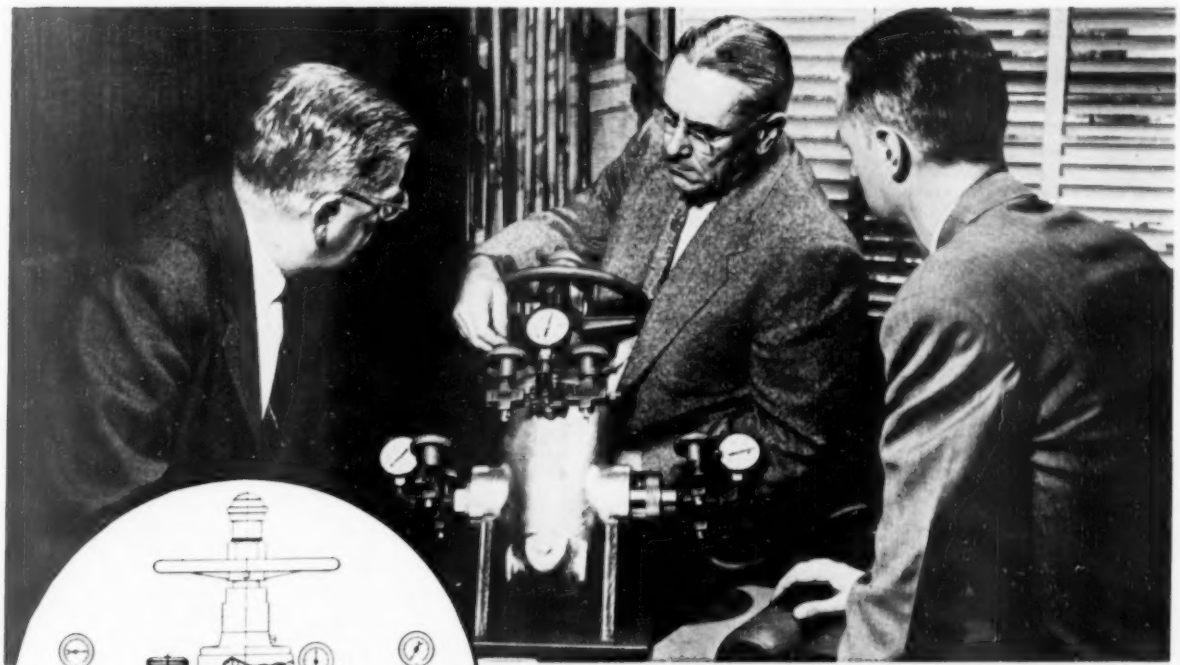
THE BANK OF NEW YORK

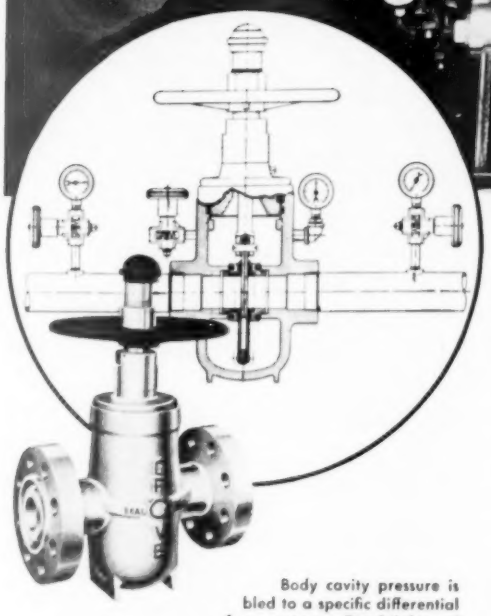
New York's First Bank • Founded 1784

Main Office: 48 WALL ST. ☆ *Uptown Offices:* 530 FIFTH AVE. ☆ MADISON AVE. AT 63rd ☆ MADISON AVE. AT 73rd

Member Federal Deposit Insurance Corporation

WE'LL MAKE THIS TEST WHEREVER YOU SUGGEST





Body cavity pressure is bled to a specific differential from upstream. Dead-tight seal is verified by non-variance of cavity pressure gauge.

The only gate valve you can check in the line—any time.

SEE FOR YOURSELF HOW GROVE SEAL-"O"-RING GATE VALVES CAN BE CHECKED IN THE LINE...for positive dead-tight seal and free-moving gate action

Your Grove sales engineer is equipped to demonstrate this new field method of testing and checking the dead-tight seal and free-moving gate action of Grove Seal-"O"-Ring Gate Valves—*right in your office*, or wherever you suggest. Simulating actual conditions, this test proves conclusively that Grove Seal-"O"-Ring Valves hold tight as a line blind, yet permit free movement of the hand-wheel at all times. Also, excess body cavity pressure is automatically relieved *internally* to the upstream line by piston-action of Seal-"O"-Ring seat assemblies, actuated by pressure differential. This test set-up shows how you can install this system for checking Grove valves right in the line—at any-time—without loss of gas or liquid. You must see it—to believe it. Contact your nearest Grove District Office today, to arrange for test demonstration.

GROVE SEAL-"O"-RING Gate Valves

GROVE REGULATOR COMPANY • 65th & Hollis Sts., Oakland 8, California

HOUSTON 4—1901 Calumet St. • **LOS ANGELES 14**—649 So. Olive St. • **NEW YORK 17**—415 Lexington Ave.

GROVE
SIMPLICITY
ACCURACY
SAFETY

CORPUS CHRISTI, TEXAS	ODESSA, TEXAS	DALLAS, TEXAS	TULSA, OKLAHOMA	LAFAYETTE, LA.	SHREVEPORT, LA.	NEW ORLEANS, LA.	DENVER, COLO.
4534 No. Baldwin Blvd.	2604 Kermit Hwy.	1334 Fidelity Union Life Bldg.	318 Thompson Bldg.	101 Berkeley St.	3727 Greenway Pl.	331 Sena Drive	2669 Cherry St.

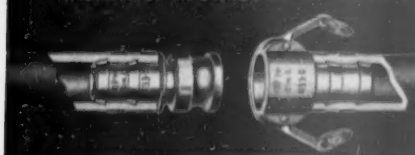
The Fastest, Surest Coupling Known

KAMLOK quick couplers

INDUSTRIAL HOSE LINES
TANK TRUCK
FUEL DELIVERY
MARINE SERVICE

Make field repairs quickly with this simple attachment of hose to KAMLOK shank type adaptor and coupler by using hose clamps. Leak-proof, light weight, easy to handle.

ALL KAMLOKS COUPLE AND UNCOUPLE INSTANTLY REGARDLESS OF HOOK-UP.



KAMLOK'S POSITIVE SEAL ALL ALONG THE LINE ASSURES GREATER SAFETY IN HANDLING ALL TYPES OF LIQUIDS.

Excellent hose has been condemned too often because of inferior couplings. To eliminate twisting, kinking, and straining, to add extra life and endurance to your hose use a good coupler . . . use KAMLOKS. Available in any combination to meet coupling requirements in sizes from ¾" to 3" precision machined of special hard wear resistant bronze. 4" size of OPALUMIN.*

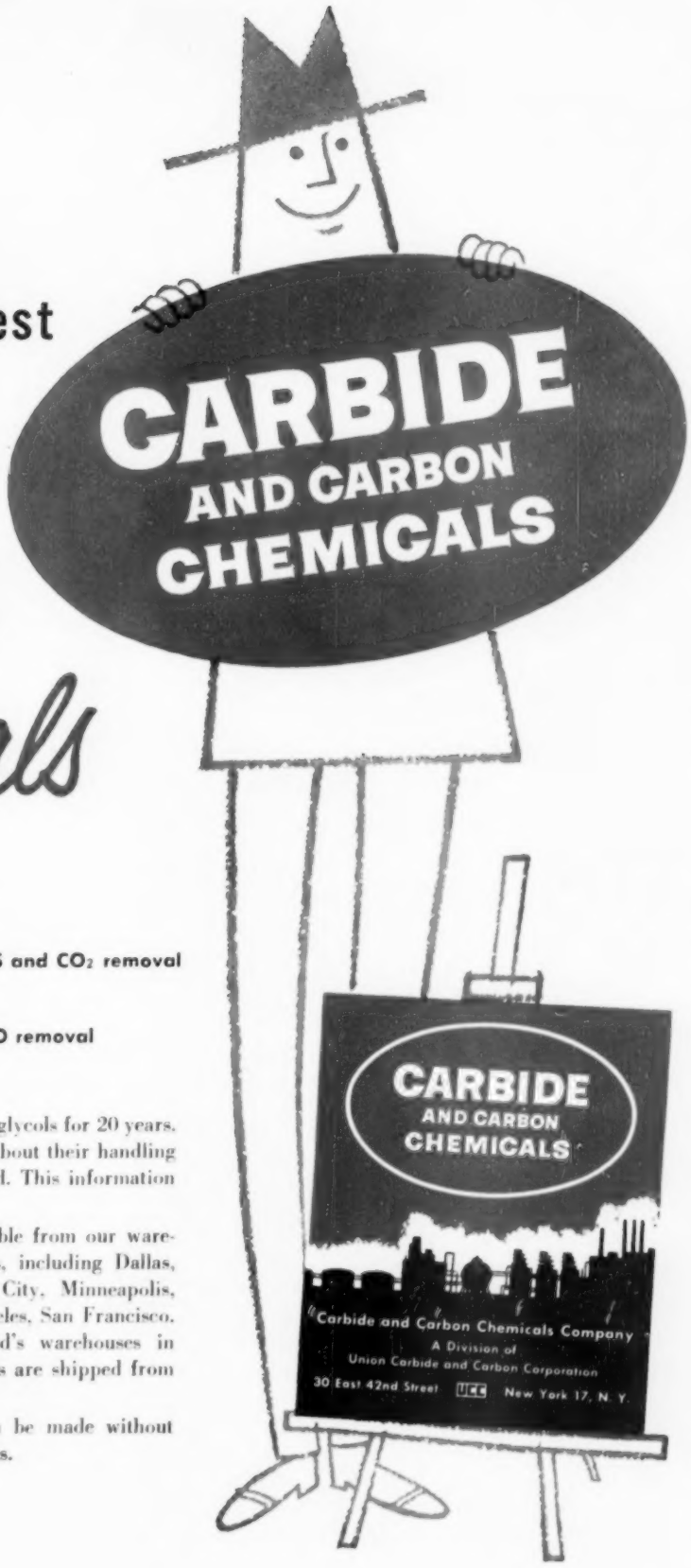
**OPW hi-tensile aluminum alloy.*

FREE BULLETIN F-10 HIGHLIGHTS IN DETAIL KAMLOK's QUICK, TIGHT SEAL.

OPW CORPORATION
2731 COLERAIN AVENUE
CINCINNATI 25, OHIO

OPW CORPORATION FOR HANDLING HAZARDOUS LIQUIDS — OPW — VALVES · FITTINGS · ASSEMBLIES — CINCINNATI 25, OHIO

The sign of the best in *gas treating chemicals*



MONOETHANOLAMINE
DIETHANOLAMINE } For H_2S and CO_2 removal

DIETHYLENE GLYCOL
TRIETHYLENE GLYCOL } For H_2O removal

• CARBIDE has been supplying amines and glycols for 20 years. During this time, we have learned much about their handling and use, especially in the gas-treating field. This information is yours by writing to our nearest office.

• These gas-treating chemicals are available from our warehouses in the major gas-producing areas, including Dallas, Houston, Tulsa, New Orleans, Kansas City, Minneapolis, Billings, Salt Lake City, Denver, Los Angeles, San Francisco. In Canada — from Harrisons & Crosfield's warehouses in Calgary, Edmonton, Vancouver. Drum lots are shipped from the warehouse or plant nearest you.

• Tank-car and tank-truck shipments can be made without delay directly from one of our several plants.

Vogt

WELDED PRESSURE VESSELS

Top quality power and process plant equipment for safe operation at high or low pressures and temperatures is produced here for leading Petroleum Refineries, Chemical Plants, and Power Plants the world around.

A growing preference for Vogt welded pressure vessels is due to skilled personnel, powerful X-ray apparatus to control weld quality and modern stress relieving furnaces, combined with complete laboratory facilities for tests of welds.

A. P. I.—A. S. M. E. and A. S. M. E. CODES
CARBON STEEL and ALLOY STEELS

HENRY VOGT MACHINE CO.
INCORPORATED
LOUISVILLE 10, KENTUCKY
BRANCH OFFICES NEW YORK, PHILADELPHIA, CLEVELAND, CHICAGO, ST. LOUIS, DALLAS

NEW

Axelson 6′ stroke hydraulic pumping unit

The Axelson Model H-100 answers the need for a pumping unit that has low initial cost coupled with trouble-free operation. An almost constant oil flow is possible because the unit combines a fast downstroke with a slow upstroke, thus increasing the volumetric efficiency of the sub-surface pump. Axelson's hydraulic reversal valve (patent applied for) assures a gentle reversal action which is easy on sucker rods.

CHECK THESE FEATURES:

TRIPOD BASE allows spacing of the sub-surface pump by insertion of sub-couplings between the well and unit polished rod. One leg of the base is used for porting high pressure fluid, while a second leg carries discharge fluid from cylinder base back to the fluid reservoir. A very important feature of this spacing assures contamination of the hydraulic fluid. A flange at the bottom of the tripod base forms the upper mating surface of a special Axelson casing head adapter. Adapters are available to fit any standard well head casing flange.

CYLINDER BASE may be called the "sub" of the unit. The unit piston attaches to the bottom of the base, the cylinder with the top portion and the reverse valve assembly attaches to one side. High power and exhaust fluids are ported through the cylinder base. An important feature is the ability to provide adequate pressure at lower reversal, which assures operation of the pilot valve. This is an asset particularly important on viscous wells.

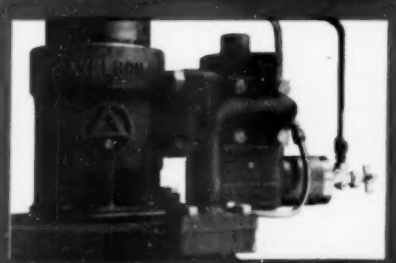
REVERSE VALVE AND PILOT VALVE are both hydraulically operated and the combination is completely fluid in design. Only three pressure lines feed into the pilot valve. One is internally constructed to one end and two to the other end. Each of the pressure sources operates on different areas.

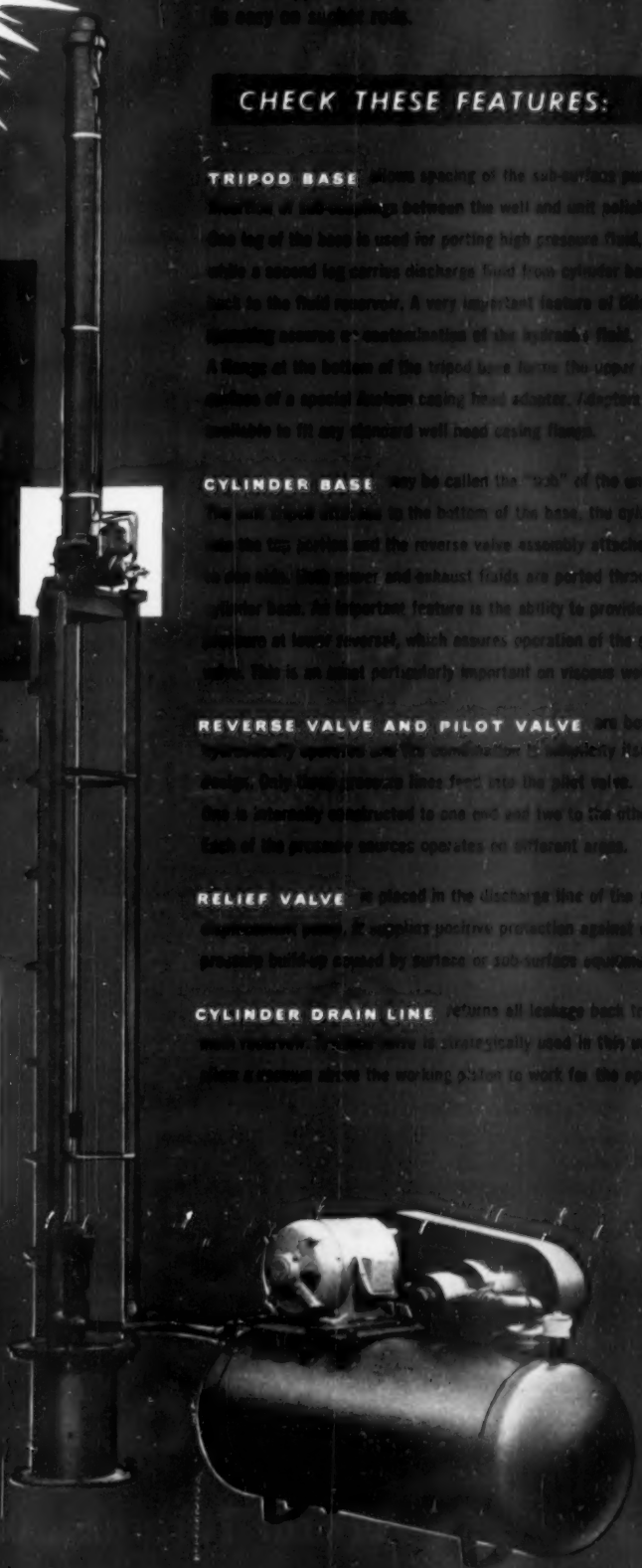
RELIEF VALVE is placed in the discharge line of the positive displacement pump. It supplies positive protection against excessive pressure build-up caused by surface or sub-surface equipment.

CYLINDER DRAIN LINE returns all leakage back to main reservoir. Pressure valve is strategically used in this unit to allow a pressure above the working piston to work for the operator.

SPECIFICATIONS

Polished Rod Load (Max)	14,000 Lbs.
Stroke Length (Nominal)	6 Feet
Strokes Per Minute (Max)	4.5
Upstroke Polished Rod Speed (Max)	54 FPM
Pump	10 GPM
System Fluid (Approx.)	85 Gals.
Cylinder Diameter	5 Inches
Operating Pressure (Max)	700 PSI
Input Horsepower (Max)	15 HP





PRESSED STEEL CAR COMPANY, INC.

Think of Tomorrow's Water Needs Today

Growth—production—expansion—apply those words to city, farm or factory and you find that accomplishment is tightly tied to water. And yet planning for tomorrow's water needs is too frequently postponed until tomorrow becomes—today.

Layne ground water development service is unique in the dictionary sense of the word. A service that may—and frequently does—start with exploration. A service that has no ending—a continuing service—for Layne's responsibility to a Layne project or installation lasts as long as the need for water exists.

That service is available to everyone. It costs no more—and usually a lot less—because from initial surveys and test drilling to completed installation Layne brings to any job of any size the pooled knowledge of nearly three quarters of a century.

The Layne organization is glad to be of service on any immediate phase of ground water development—maintenance or modernization of existing equipment—new pump equipment—drilling—exploration or water treatment.

But also it is wisdom to use that service today in forecasting the needs of tomorrow. Why not permit Layne to make—with your assistance—the plans that will provide a dependable adequate water supply for the years that lie ahead.

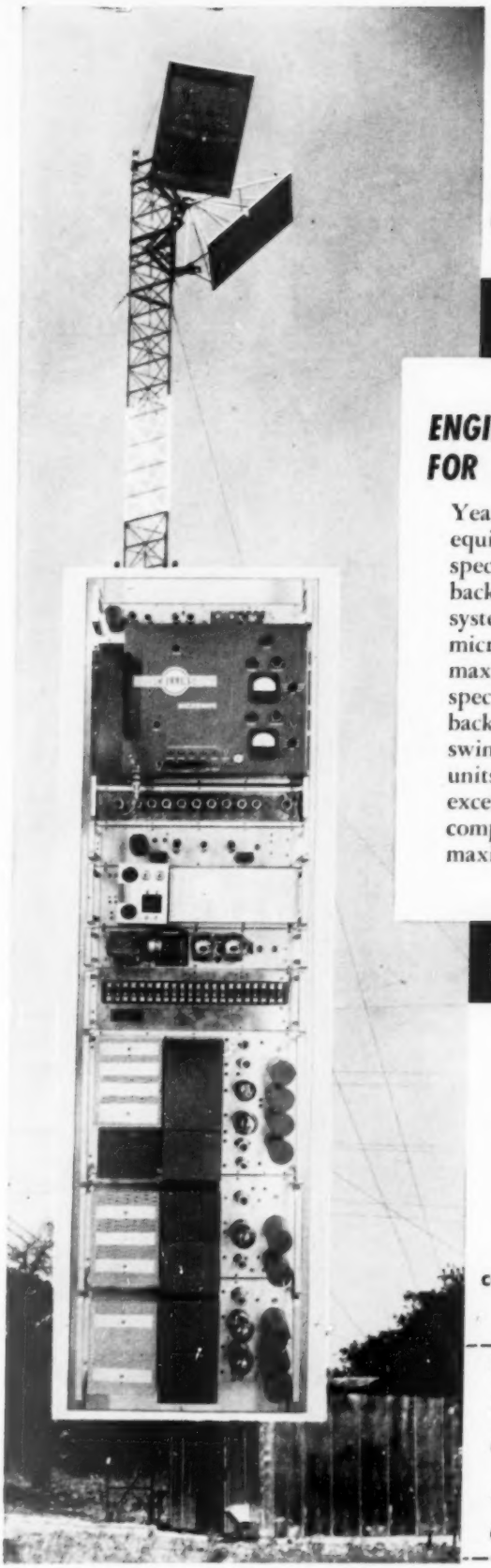
LAYNE & BOWLER, INC.
Memphis 8, Tennessee

Layne Associate Companies Throughout the World

Layne

■ Agriculturists will be interested in a free booklet—"Layne for Profitable Irrigation." Sent upon request.

Water Wells • Vertical Turbine Pumps • Water Treatment



COLLINS MICROWAVE

ENGINEERING EXCELLENCE BUILT IN FOR MAXIMUM RELIABILITY

Years of supplying advanced radio-electronic equipment for aviation, broadcasting and specialized industry give Collins the required background for providing ideal microwave systems for the oil and pipeline industries. Collins microwave uses unit type construction for maximum installation flexibility to meet a user's specific needs. All equipment is mounted back to back on standard relay racks. Articulated swing-out hinges permit access to the rear of the units. Advanced design, built in engineering excellence and conservatively operated components assure superior performance and maximum reliability.

COLLINS

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 W. 42nd Street, NEW YORK 36
1930 Hi-Line Drive, DALLAS 2
2700 W. Olive Avenue, BURBANK

COLLINS RADIO COMPANY OF CANADA, LTD., 74 Sparks St., Ottawa, Ont.

SEND this coupon today for complete technical information.

Please send me complete information on Collins Microwave.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

"I sure belted costs when I put U. S. Rainbow V-Belts on my rigs,"

says "Red" Royal

"Just about the only way I can cut costs these days is to keep downtime to a minimum," says this toolpusher. "And that means my equipment has to be absolutely reliable. I insist on U. S. Rainbow® V-Belts for the plain reason that they take rough treatment and outperform any belt I've ever used. I haven't had a breakdown yet. My costs tell the story."

Drillers in every field can repeat "Red" Royal's words. *U. S. Rainbow V-Belts will save you money.* Each has the unique Equa-Tensil Cord Section—exclusive with United States Rubber Company—that enables each cord to pull its full share of the load—for extra power. Depend on "U. S." for the *quality* products that make your drilling dollars deliver *more.*

Developed by Science—
Proved by Drillers

Available in all FIELDS at SUPPLY STORES

US RUBBER

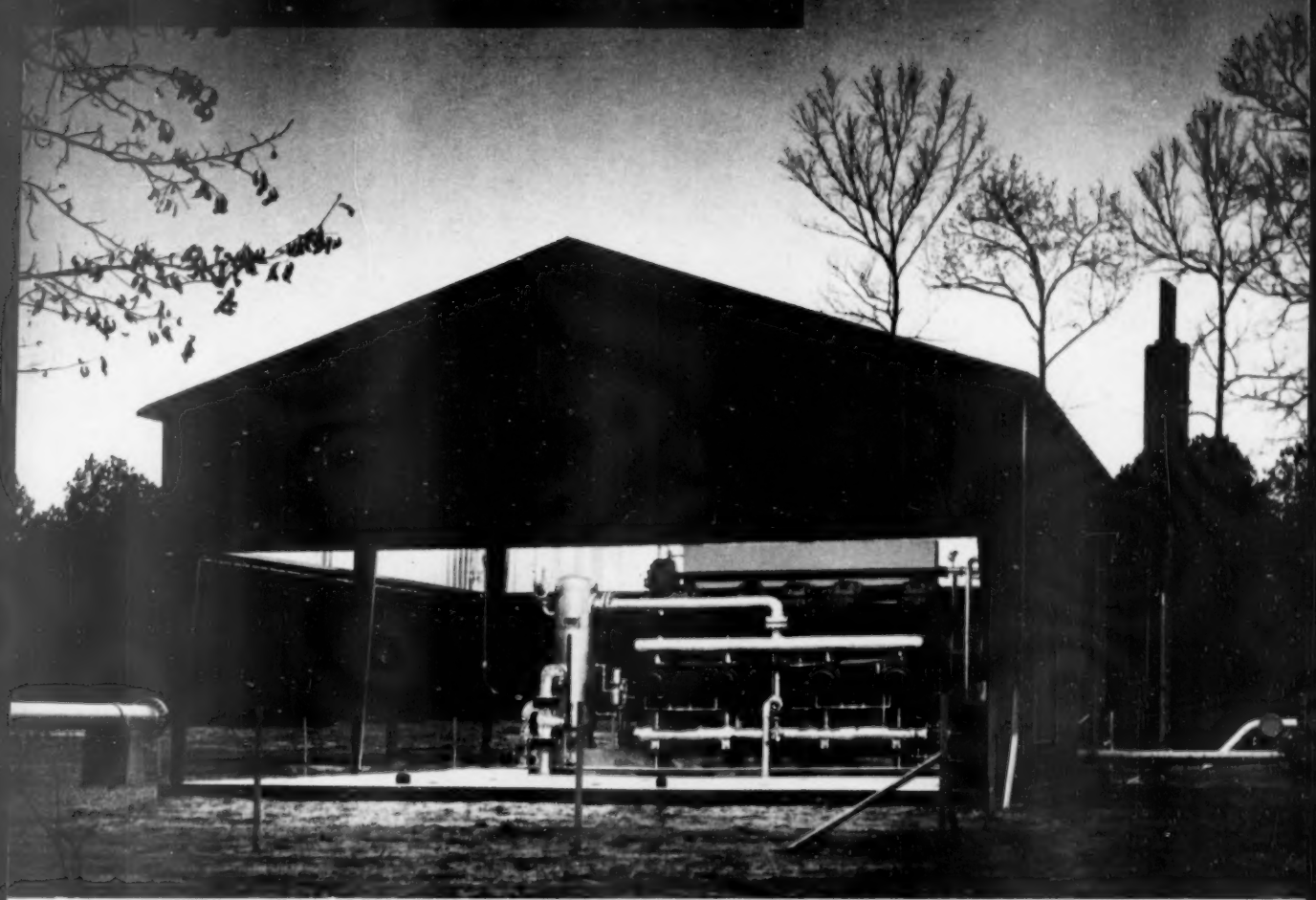
UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.

BEAIRD-INGERSOLL-RAND

Packaged Compressor Plant

Lowest Cost Per Horsepower Installed



This packaged compressor plant is complete with Ingersoll-Rand gas engine driven compressor, Young radiator and all necessary equipment and controls. Sizes from 110 h.p. to 550 h.p.

NATURAL GAS & OIL COMPANY has a compressor station in Sligo Field, Louisiana, which is planned for maximum use of compressor horsepower throughout the life of the wells it serves. To boost gas from low pressure wells into gathering lines the company recently installed one single-stage 550 horsepower Beaird-Ingersoll-Rand packaged compressor plant. In the future, as well head pressures fall, a second 550 horsepower unit may be installed in space already provided in the same building. Later, both compressor plants may be easily converted to two-stage units. And finally, as the well is nearing depletion, one of the compressor plants may be transferred as a complete package to another site, leaving the remaining plant to complete production.

Let us show you the economy of using Beaird-Ingersoll-Rand packaged compressor plants for gas production.

Boosts field gas —

HOW ONE PRODUCER PLANNED A FLEXIBLE COMPRESSOR STATION

THE J. B. BEAIRD COMPANY, INC.

Shreveport, Louisiana

BEAIRD

MACHINING MANUFACTURING STEEL WAREHOUSE

PACKAGED COMPRESSOR PLANTS

CAST STEEL FITTINGS

PRESSURE BULK STORAGE

ANHYDROUS AMMONIA EQUIPMENT

LP-GAS SYSTEMS

BEAIRD *Cast Steel Fittings*

Fittings that fit

FITTINGS *IN A HURRY*

Need fittings in a hurry? Want to be sure of meeting your deadlines? Have to meet an emergency with minimum down time? Then ask your supply house..or call us direct..for immediate shipment of Beaird fittings from our large stock of standard sizes. Save time in ordering by using the convenient selection charts and figure numbers in our new catalog No. 153. We can also give you prompt delivery on special fittings from our wide assortment of patterns.

Write for Catalog 153 and let us put your name on our mailing list for current stock lists.

THE J. B. BEAIRD COMPANY, INC. *SHREVEPORT, LOUISIANA*

BEAIRD

MACHINING MANUFACTURING STEEL WAREHOUSE

PACKAGED COMPRESSOR PLANTS

CAST STEEL FITTINGS

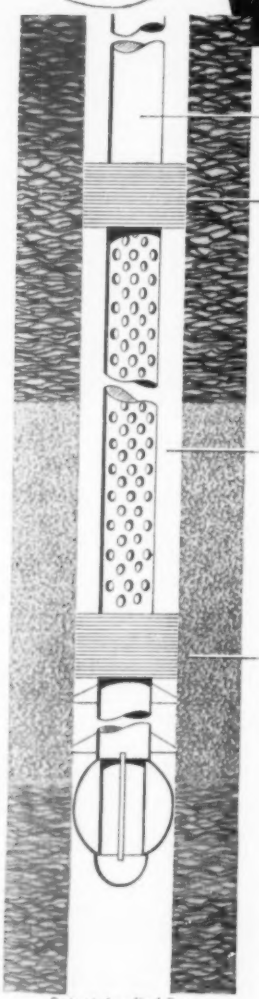
PRESSURE BULK STORAGE

ANHYDROUS AMMONIA EQUIPMENT

LP-GAS SYSTEMS

another Johnston first!
SELECTIVE ZONE TESTER

Get tests at any level without tail pipe!



Patent Applied For

- Test more than one zone with a single trip in the hole!
- Eliminate cost and hazard of setting on cement plug!
- Evaluate zones passed up while drilling!
- Pin-point gas/oil and water/oil contact!
- Save rig-time and money!

Watch for more information on Johnston's NEW . . . FIELD PROVEN SELECTIVE ZONE TESTER

Write for Brochure

JOHNSTON TESTERS

first in drill stem testing

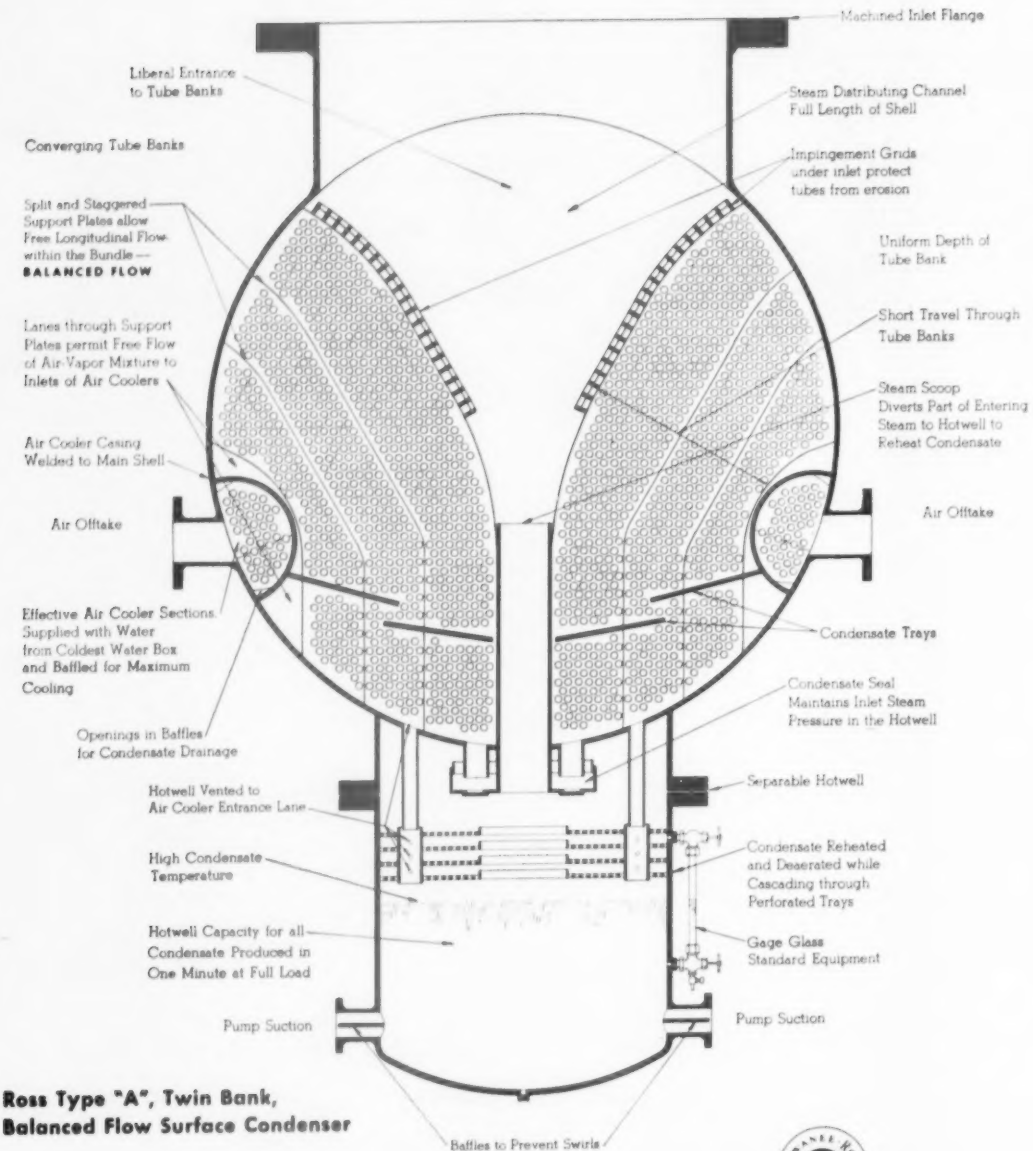
HOUSTON, TEXAS

LOS ANGELES, CALIF. • CALGARY, CAN.

FORMATION AND CASING TESTING — JOHNSTON

ZT-541

Design features that make Ross Surface Condensers A SOUND INVESTMENT


Machined Inlet Flange
Liberal Entrance to Tube Banks
Converging Tube Banks
Steam Distributing Channel Full Length of Shell
Impingement Grids under inlet protect tubes from erosion
Split and Staggered Support Plates allow Free Longitudinal Flow within the Bundle — BALANCED FLOW
Uniform Depth of Tube Bank
Short Travel Through Tube Banks
Lanes through Support Plates permit Free Flow of Air-Vapor Mixture to Inlets of Air Coolers
Steam Scoop Diverts Part of Entering Steam to Hotwell to Reheat Condensate
Air Cooler Casing Welded to Main Shell
Air Offtake
Air Offtake
Effective Air Cooler Sections Supplied with Water from Coldest Water Box and Baffled for Maximum Cooling
Condensate Trays
Condensate Seal Maintains Inlet Steam Pressure in the Hotwell
Openings in Baffles for Condensate Drainage
Separable Hotwell
Hotwell Vented to Air Cooler Entrance Lane
Condensate Reheated and Deaerated while Cascading through Perforated Trays
High Condensate Temperature
Hotwell Capacity for all Condensate Produced in One Minute at Full Load
Gage Glass Standard Equipment
Pump Suction
Pump Suction
Baffles to Prevent Swirls

Ross Type "A", Twin Bank, Balanced Flow Surface Condenser

The facts and figures on Ross Surface Condensers are impressive. It will be time well spent to have a Kewanee-Ross representative tell you *all* about the design features and distinct advantages of this truly modern line.

Long a leader in the field, the originator of such noteworthy developments as all-welded steel surface condenser construction, Kewanee-Ross is in a key position to meet your requirements *exactly* with standardized or special, large or moderate size, or packaged units.

For the complete story—at your desk—write today.

KEWANEE-ROSS CORPORATION
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
1417 WEST AVENUE • BUFFALO 13, N. Y.
In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.

KEWANEE-ROSS PRODUCTS
ROSS

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

TRI-CLAD* VERTICAL explosion-proof motors, like these belonging to Pan American Pipe Line Company and located adjacent to Rancho Pipe Line System's Eldorado Station, are available to suit the requirements of the pump mounting. This is just one of G-E's complete line of pipe-line motors.

TOTALLY ENCLOSED EXPLOSION-PROOF motors have been tested and listed by Underwriters' Laboratories for Class I Group D hazardous locations. Like this one at Sinclair Pipe Line Company's Clinton Station, they withstand all weather conditions, do not require firewall.

G-E Pipe-line Motors Can Help You Reduce Your Maintenance and Inspection Costs

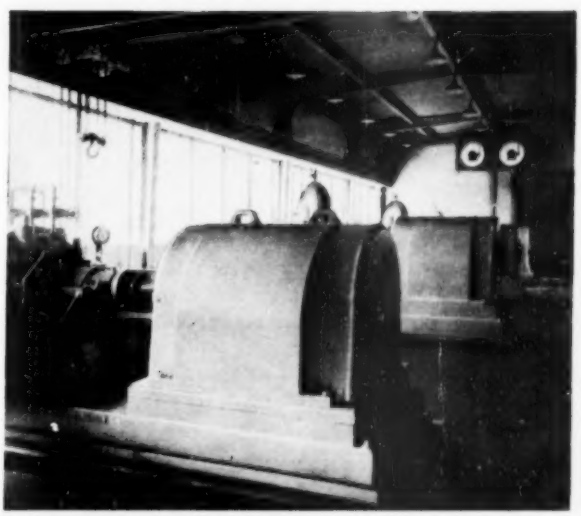
For the vital, continuous service which pipe line pumping requires, specify G-E motors. You can install them in your isolated stations and forget them for months at a time—because their rugged construction and high quality materials are designed specifically for long, dependable life in pipe-line service.

Wide selection offered by G.E. assures you the best motor for the job. For special applications, G.E. has the engineering experience necessary to design and build motors to meet your special requirements.

G.E.'s application and field engineers can serve you as a staff of experts on all your electric pipe-line equipment—to give you a co-ordinated, well-balanced system. And no matter where your pipe line reaches, you'll find G-E sales and service facilities all along its path to help you keep your throughput at a maximum under all conditions.

For more information, contact your G-E Apparatus Sales representative. *General Electric Company, Schenectady, N. Y.* 830-2

*Reg. trademark of General Electric Co.



BASE-VENTILATED MOTORS up to 3000 hp may be force-ventilated like these at Rancho Pipe Line System's Garfield Station. Separate blowers are started in advance to purge motor and duct system.

GENERAL ELECTRIC

What does it take to build an "Oil Bank"?

DEPOSITORS ...

Depositors who choose the Republic to keep their $576,000,000 working for southwestern prosperity. They're the backbone that gives a bank the strength to serve.

and DRILLERS

Drillers who use their minds, muscle and money to find and produce oil. They build an industry that needs experienced oil-financing service. And that's what makes an "Oil Bank."

This is your Republic!

REPUBLIC
NATIONAL BANK of Dallas

CAPITAL AND SURPLUS $50,000,000 LARGEST IN THE SOUTH

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Runs unattended for weeks

... with help of TIMKEN® bearings

THIS gas-gathering Worthington compressor chugs away for weeks on end with only an occasional inspection by the Louisiana oilmen who operate it.

One important reason for its high dependability: Worthington mounts the crankshaft on Timken® bearings to keep it in accurate alignment. This drastically reduces wear on related parts. It saves maintenance, stops trouble, and increases equipment life.

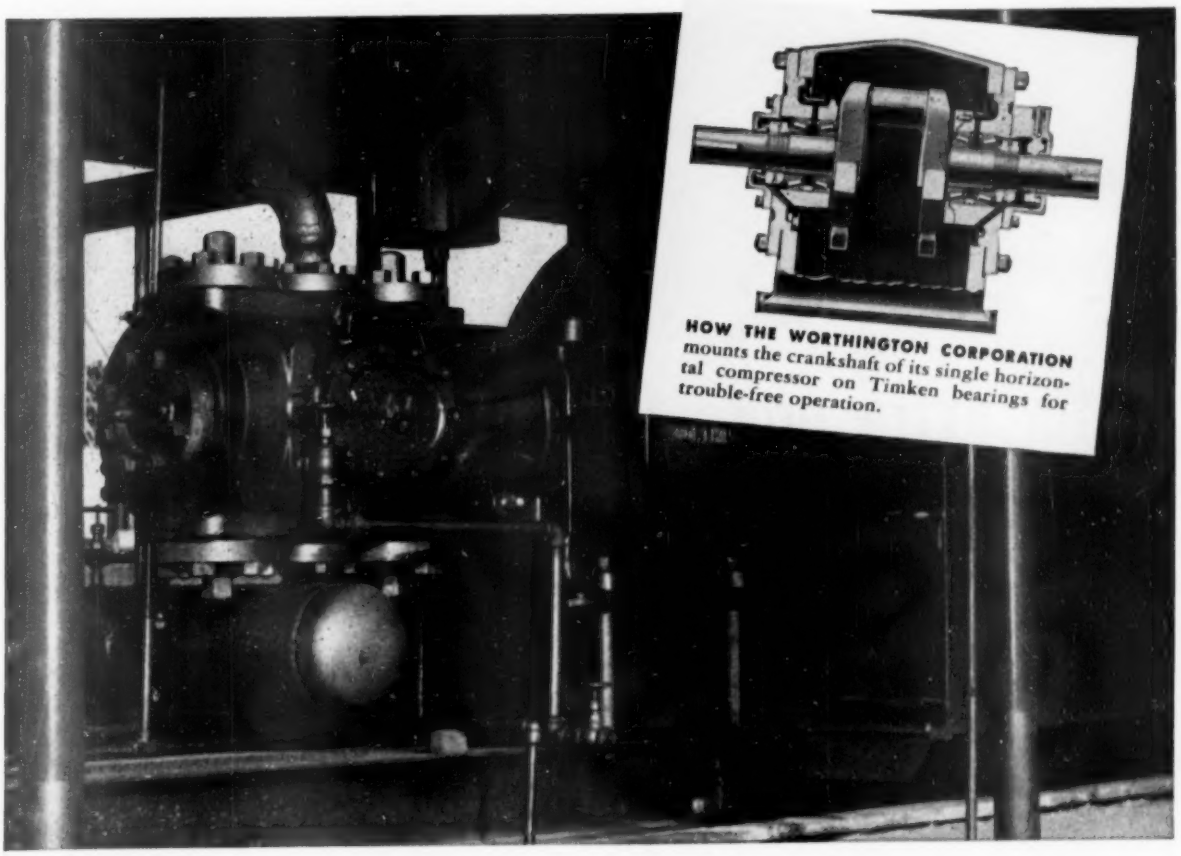
Keeping the crankshaft of these big compressors in accurate alignment is no small problem because the one big cylinder and two flywheels exert heavy stresses. Timken bearings solve the problem because they have high load capacity; the load is carried on a full *line contact between* races and rollers.

Moreover, these rollers and races are tapered which enables the bearing to take both radial and thrust loads in any combination. Thus the crankshaft is prevented from moving either laterally or vertically and no extra thrust devices are needed to do it.

Note that although the compressor is covered, the sides are exposed to the weather and this makes good bearing closures important. Timken bearings are built to close tolerances which keep shafts and housings concentric. This makes bearing seals more effective, keeps dirt and dust out, lubricant in.

For dependable, low-cost operation, specify Timken bearings when *you* buy or build equipment. Always look for the trade-mark "Timken" on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



HOW THE WORTHINGTON CORPORATION mounts the crankshaft of its single horizontal compressor on Timken bearings for trouble-free operation.

WE MAKE OUR OWN STEEL

The special grade alloy steel which gives Timken bearings their strength and resistance to wear is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TAPERED ROLLER BEARINGS

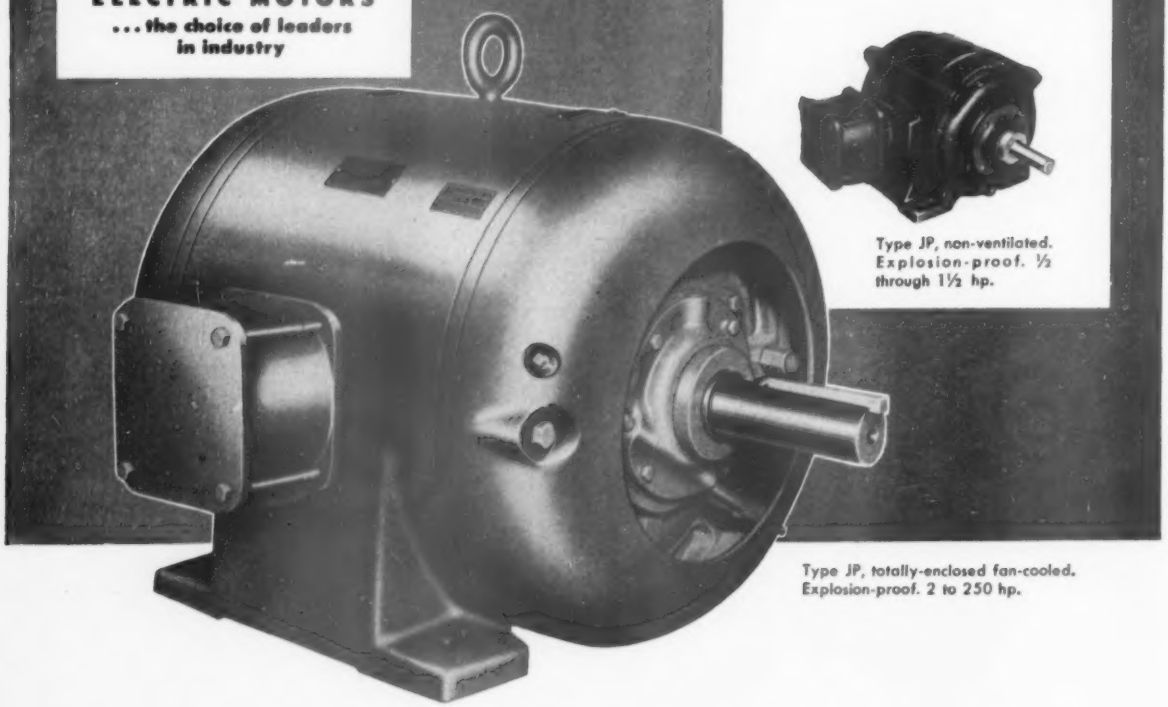
NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ✳ AND THRUST ○ LOADS OR ANY COMBINATION

Wagner®

ELECTRIC MOTORS

... the choice of leaders in industry

Type JP, non-ventilated. Explosion-proof. ½ through 1½ hp.



Type JP, totally-enclosed fan-cooled. Explosion-proof. 2 to 250 hp.

for extra protection against corrosion

SPECIFY Wagner CAST IRON FRAME MOTORS

Here are stock motors specifically designed for use in chemical plants, oil fields, refineries, steel mills—for rugged industrial applications where dust, dirt, moisture, or corrosive vapors are present.

These motors are totally-enclosed in corrosion-resistant cast iron and all parts exposed to the atmosphere are of corrosion-resistant material—including the nameplate. They feature completely protected laminations . . . special varnish treated windings . . . and a running shaft seal.

Wagner Cast Iron Frame Motors are available in fan-cooled standard and explosion-proof types in ratings from 2 to 250 hp, and in non-ventilated standard and explosion-proof types in ratings from ½ through 1½ hp. Wagner Bulletin MU-132 gives complete information.

A skilled Wagner engineer can help you select a Wagner Motor to meet your most exacting specifications. Call the nearest of our 32 branch offices, or write us.

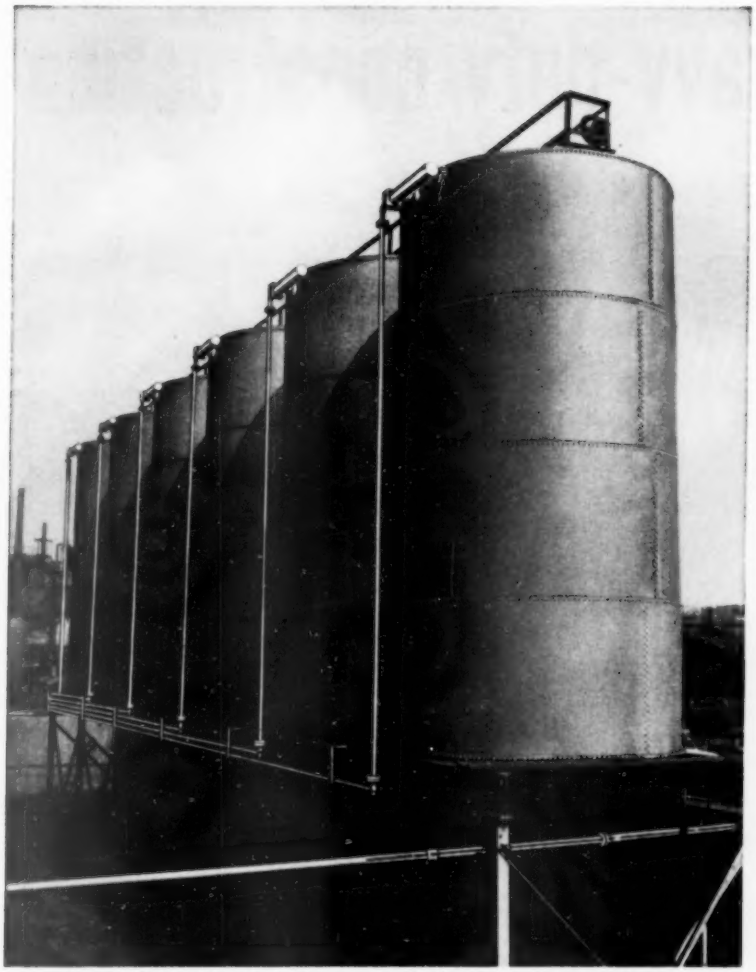
Wagner Electric Corporation EST. 1891

WAGNER ELECTRIC CORPORATION
6389 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

M34-9



Millions of Gallons of Gasoline are here protected against fire by a Rockwood Double-Barrelled FOAM Chamber.

Jet action for a fire

The cylindrical objects at the top of the gas tanks in the picture above are Rockwood Double-Barrelled FOAM Maker Chambers — protecting millions of gallons of gasoline.

Should fire occur, the FOAM-Making Chambers would quickly control it, thus preventing any rupture of the tanks and the resultant spill fire. Such a fire could endanger the industrial area along the river 25 yards away and the entire river traffic, much of which is strategic material, hauled by river boats.

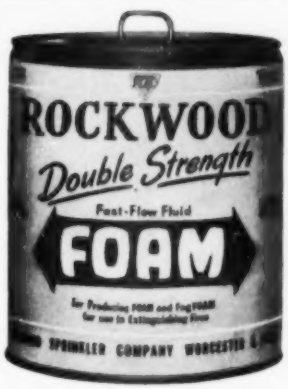
Due to a special jet action, the manually controlled Rockwood Double-Barrelled FOAM Maker Chamber puts a smothering FOAM blanket *swiftly* over flames, controlling and extinguishing the fire. Internal impinging jets discharge into two concentric barrels, one within the other, dynamically mixing air, water and FOAM liquid into a finer bubble structure than ordinarily possible. This construction is a patented one and typical of the many ways in which Rockwood engineers water to cut fire losses.

ROCKWOOD SPRINKLER COMPANY

Engineers Water . . . to Cut Fire Losses

How Rockwood Engineers Water to Cut Fire Losses

The Rockwood Double-Barrelled Foam Maker Chamber has a patented, compact design that eliminates supporting brackets, makes it easy to install. Also easy to inspect from top of tank. Wide range of sizes.



Rockwood Double Strength Foam puts out flammable liquid fires quicker, at lower cost. Three parts FOAM and 97 parts water create a heat-resistant blanket. Double strength FOAM flows freely at −15°F.

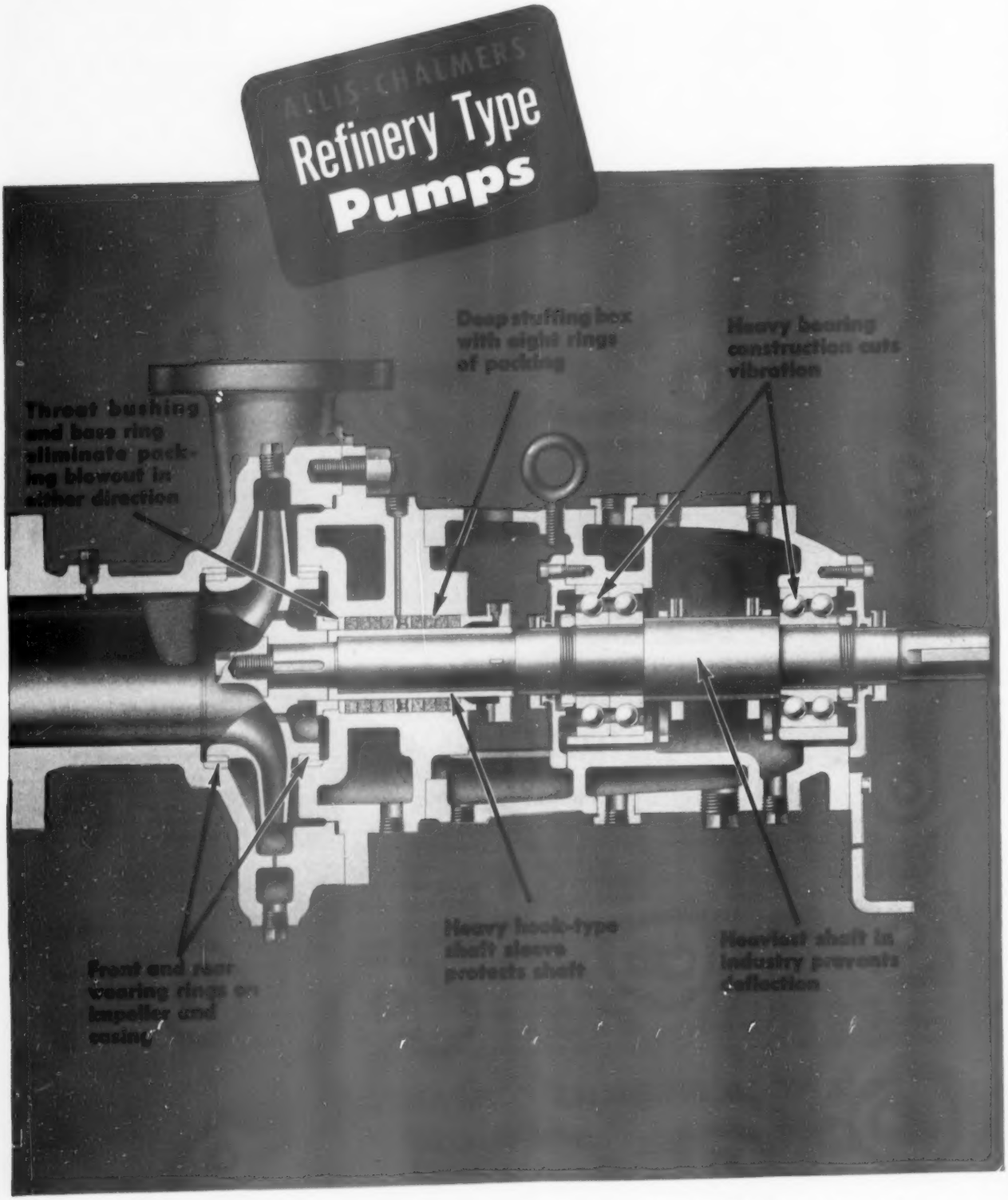
SEND FOR THIS INFORMATIVE BOOKLET

ROCKWOOD SPRINKLER COMPANY
Portable Fire Protection Division
104 Harlow Street
Worcester 5, Mass.

Please send me your illustrated booklet on Rockwood fire fighting products.

Name .....
Title .....
Company .....
Street .....
City .....
Zone ..... State .....

EXTRA heavy-duty construction


ALLIS-CHALMERS
Refinery Type
Pumps
Deep stuffing box with eight rings of packing
Heavy bearing construction cuts vibration
Throat bushing and base ring eliminate packing blowout in either direction
Heavy hook-type shaft sleeve protects shaft
Heaviest shaft in industry prevents deflection
Front and rear wearing rings on impeller and casing

gives you service continuity

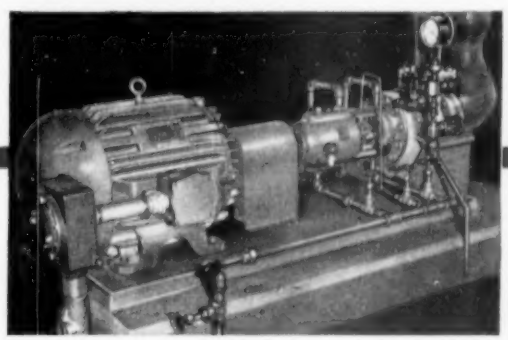
WHERE A STOPPAGE COSTS A FORTUNE, install Allis-Chalmers Refinery Pumps. These pumps have the stamina to keep going on the toughest applications for years without rest. Every construction detail, those shown here and many others, has been carefully engineered to provide ample reserves of strength and durability. Careful workmanship and expert application engineering make these pumps deliver all the reliability that is designed into them.

Wide Choice of Materials, Features

The Allis-Chalmers Refinery Pump can be fitted to suit your requirements exactly. Practically any material normally used in pumps may be specified. Stuffing box takes packing, mechanical seal or both. Cooling water or oil may be used in five separate places so you can select exactly the cooling arrangement for your particular needs. Suction may be at top or on end.

Get Complete Information and Engineering Help

Your nearby Allis-Chalmers representative will be glad to help you with your refinery pump problems. Or write for Bulletin 52B7775. Allis-Chalmers, Milwaukee 1, Wisconsin.



Save Engineering and Installation Time with an Allis-Chalmers Pump Package

Allis-Chalmers will supply a complete pumping unit — pump, motor and control — engineered to work together and with pump and motor mounted on a single base plate ready for installation. You save engineering time because you don't have to match components from different manufacturers. You save installation time because the unit comes to you already assembled. And, most important, you are sure that the components will work together to give you long life at low operating cost. The complete unit is covered by a single guarantee backed by Allis-Chalmers well-known customer satisfaction policy.

A-4333

ALLIS-CHALMERS

Any way you figure it,

you're ahead with REPUBLIC

TAKE IT FROM THE STANDPOINT OF QUALITY. Republic Electric Weld Casing and Tubing have been used by the oil and gas industry for more than 25 years in wells all over the world. Now Republic is also producing Seamless Casing and Tubing, on a new mill using the latest manufacturing techniques and quality control.

LOOK AT SHIPPING FACILITIES. With the new Seamless mill located in Chicago, on the Calumet River, shipments can be made to oil fields everywhere by water down the Mississippi as well as by rail.

CENTRALIZE YOUR BUYING. You can get both your Seamless and Electric Weld Casing and Tubing from one source. This cuts down paper work, makes it easier to keep track of what supplies you have and what you need.

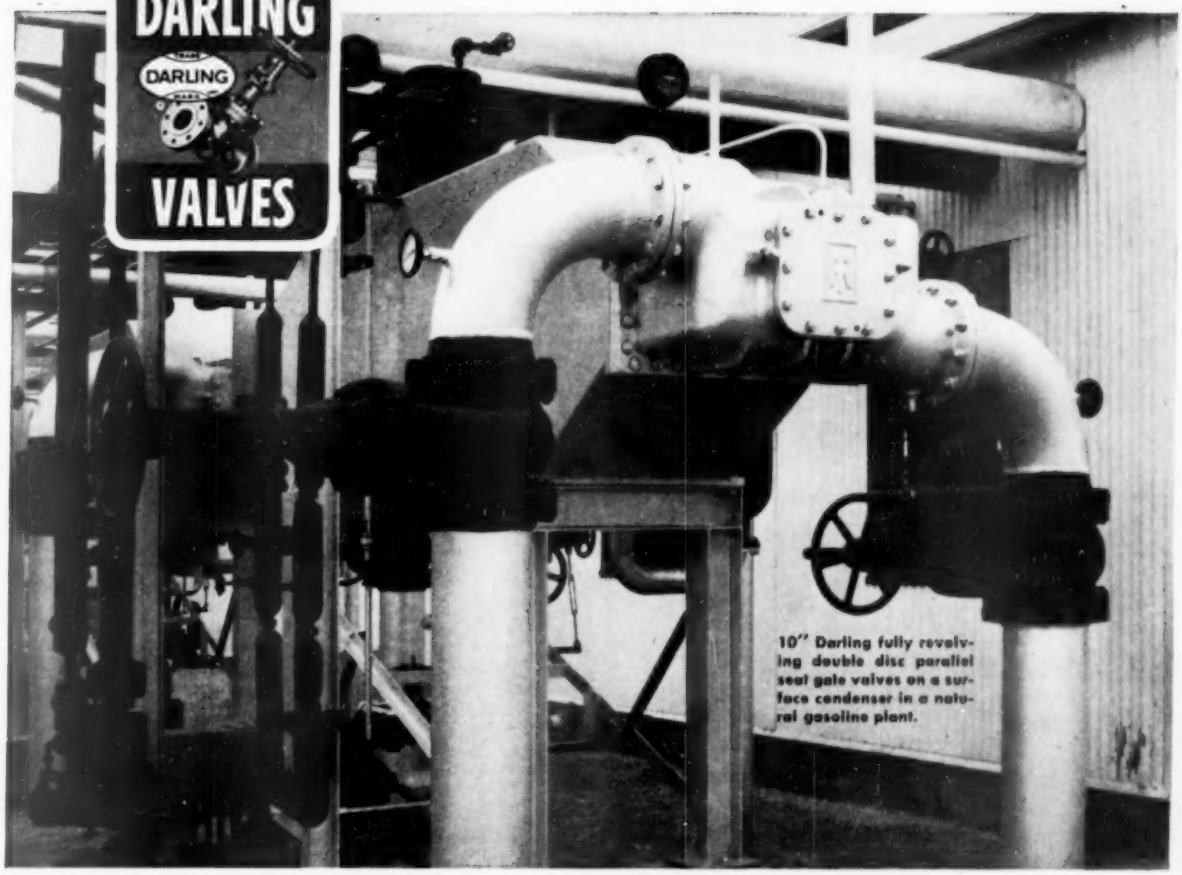
ADD IT ALL UP. If you want quality and convenience, get the whole string from Republic. A call to your nearest Republic Sales office will bring you all the facts.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

REPUBLIC
CASING AND TUBING
Electric Weld and Seamless

REPUBLIC STEEL

Other Republic Products include Line Pipe—Steel and Plastic Pipe—Carbon, Alloy and Stainless Steels—Studs, Bolts and Nuts—Heat Exchanger Tubes



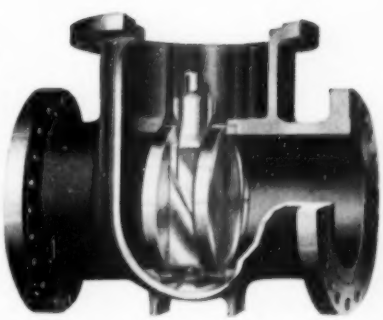
10" Darling fully revolving double disc parallel seat gate valves on a surface condenser in a natural gasoline plant.

How they save dollars in natural gasoline service with DARLING Revolving Disc GATE VALVES

TIGHT CLOSURE EVERY TIME!...That's one big advantage of Darling revolving disc gate valves on this surface condenser. The fully revolving double disc parallel seat feature of these Darling valves automatically compensates for valve body distortion, *assuring tight closure* and *uniform* distribution of disc and seat wear too... even under severe pressure and temperature changes.

JUST FOUR SIMPLE WORKING PARTS. ... Two interchangeable, no-pocket discs and two husky wedges are all the operating parts in Darling *fully revolving double disc* parallel seat gate valves. No links or other devices are needed to hold the discs and wedges together. Any part can be quickly and inexpensively replaced without removing the valve from the line.

WIDE RANGE OF SIZES. Darling revolving disc parallel seat gate valves come in types and sizes for main line, gathering, manifold, tank farm and other gas and oil line services. Just outline your specific service requirements or write for descriptive literature today!



Cutaway showing complete simplicity of the Darling fully revolving double disc parallel seat principle.

DARLING VALVE & MANUFACTURING CO.
Williamsport 1, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ontario

The manufacture-supply-service industry gives the oil industry the ultimate in....

APPLIED

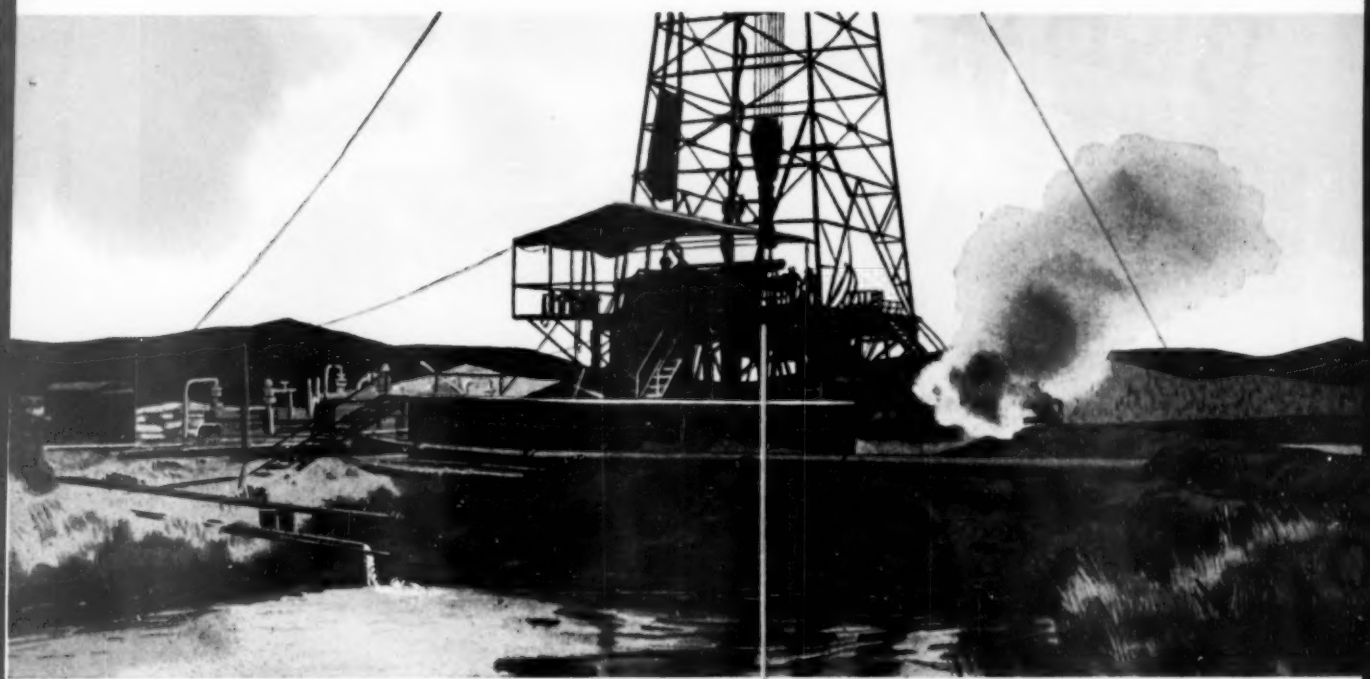
It took the world's greatest research and engineering brains to build the GIANT MECHANICAL HEART that keeps a three-mile-deep drilling well alive . . .

To build a slush pump that could keep the circulation going in a three-mile-deep well with pressures up to 3,000 pounds per square inch, and in lower pressures, in volumes up to 1,000 gallons per minute, has required practically every kind of technical knowledge.

This giant unfailing mechanical heart is the epitome of decades of study and experimenting by the combined engineering departments of leading manufacturers in the billion-dollar oil equipment business, working in the laboratories and in the oil fields. Brilliant research engineers, through these many years, have carried on: (1) experimental designing, and testing in experimental test pumps under various extreme conditions to obtain performance data; (2) field testing under actual drilling conditions. Using this data, designing engineers have, with indomitable persistence, solved problem after problem.

Yet, this giant mechanical heart could not have stood the extreme pressures, abrasive cutting, and shock, had not the science of metallurgy kept apace. Carefully controlled heat treating has resulted in the needed tougher, longer-lasting steels. Then came the manufacturing techniques using precision gauge blocks to calibrate the production gauges used in the mass production of pumps and pump parts with high uniformity in dimensions and surface finish.

SCIENTIFIC KNOWLEDGE



Now, we see in every oil field these mechanical hearts keeping wells alive with little heart trouble and seldom heart failure. This triumph of engineering is repeated in many another oil industry product that receives the ULTIMATE IN APPLIED SCIENTIFIC KNOWLEDGE FROM THE 9,000 SCIENTISTS AND ENGINEERS OF THE PETROLEUM MANUFACTURE-SUPPLY-SERVICE INDUSTRY.

Result of this applied advanced knowledge: lower costs in exploration, drilling, producing, transporting.

MANUFACTURE SUPPLY SERVICE

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION

THE NAME BEHIND THE NEWS..

World's Fastest Boat— Slo-Mo-Shun IV—averaged 178.49 mph—with Mobiloil!

1953 Pike's Peak Winner— Louis Unser roared to the top in record time—with Mobiloil!

1953 Indianapolis Race— Winner of this 500-mile classic, Bill Vukovich, used Mobiloil!

1953 Pan-American Road Race— Sports car winner, Juan Fangio, averaged 105 mph—with Mobiloil!

World's Fastest Car— John Cobb's twin-engine auto averaged 394.19 mph. It was Mobiloil-protected.

SOCONY-VACUUM OIL COMPANY, INC.

and Affiliates:

MAGNOLIA PETROLEUM COMPANY • GENERAL PETROLEUM CORPORATION

SOCONY-VACUUM

G-E Communication Promotes Their Reputation

for dependable service

BJ SERVICE, INC.

CONTINENTAL

LANE WELLS

SCHLUMBERGER

CARDINAL CHEMICAL · INC.

HALLIBURTON

Mid-Continent Supply Co.

THE CHEMICAL PROCESS CO.

DOWELL

GEOLOG

2-WAY MOBILE RADIO

And, your record of job performance is equally important! Protect it with the finest radio equipment obtainable. These industry leaders are successful because of their efforts to develop and use efficient trade tools. For reliable communications, each one immediately selected a General Electric 2-way mobile radio system. They gained the most dependable performance on the market today!

REMEMBER, G-E offers economy of operation too . . . dollar savings on maintenance you'll quickly recognize as superior to all other makes. Why not let a G-E Communications Counselor focus expert radio engineering know-how on your system requirements? Call him today at our local office or write: *General Electric Company, Section X844-12, Electronics Park, Syracuse, New York.*

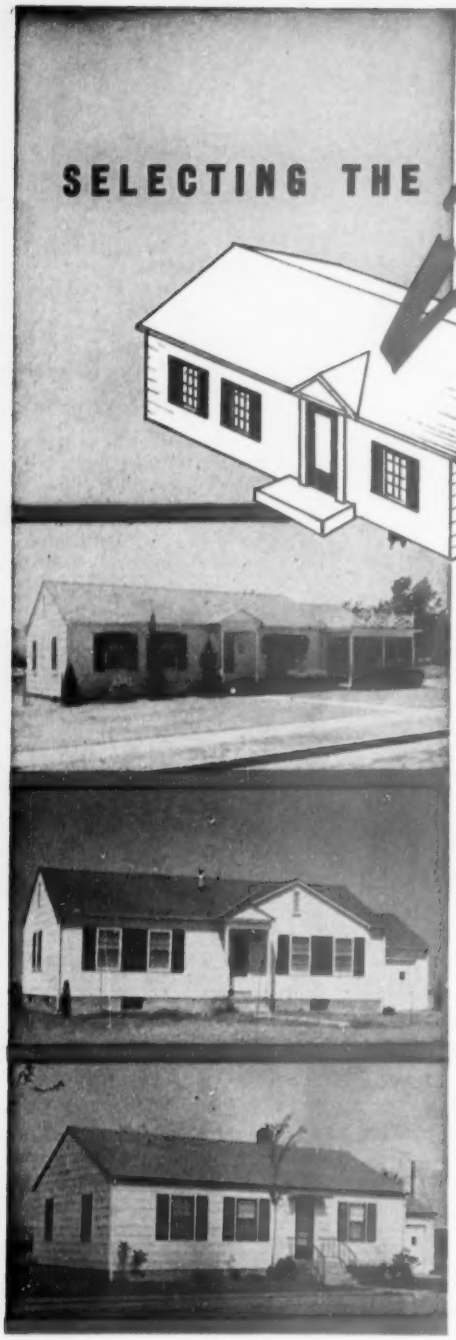
You can put your confidence in—

GENERAL ELECTRIC

WESTERN Engineered

CORE LAB

SELECTING THE *RIGHT* FIELD HOUSING IS *IMPORTANT...*



It's good employee relations to see that oil field workers have comfortable homes. It is good business to select field housing that has proved right for the oil industry for almost 35 years.

STURDYBILT Prefabricated Houses are *right* for the oil fields because they are economical, easy to erect, can be moved from one site to another, and are handsome and comfortable enough to suit the most particular oil field family.

Get the RIGHT field housing. Order STURDYBILT Prefabricated Houses.

■ WRITE FOR INFORMATION

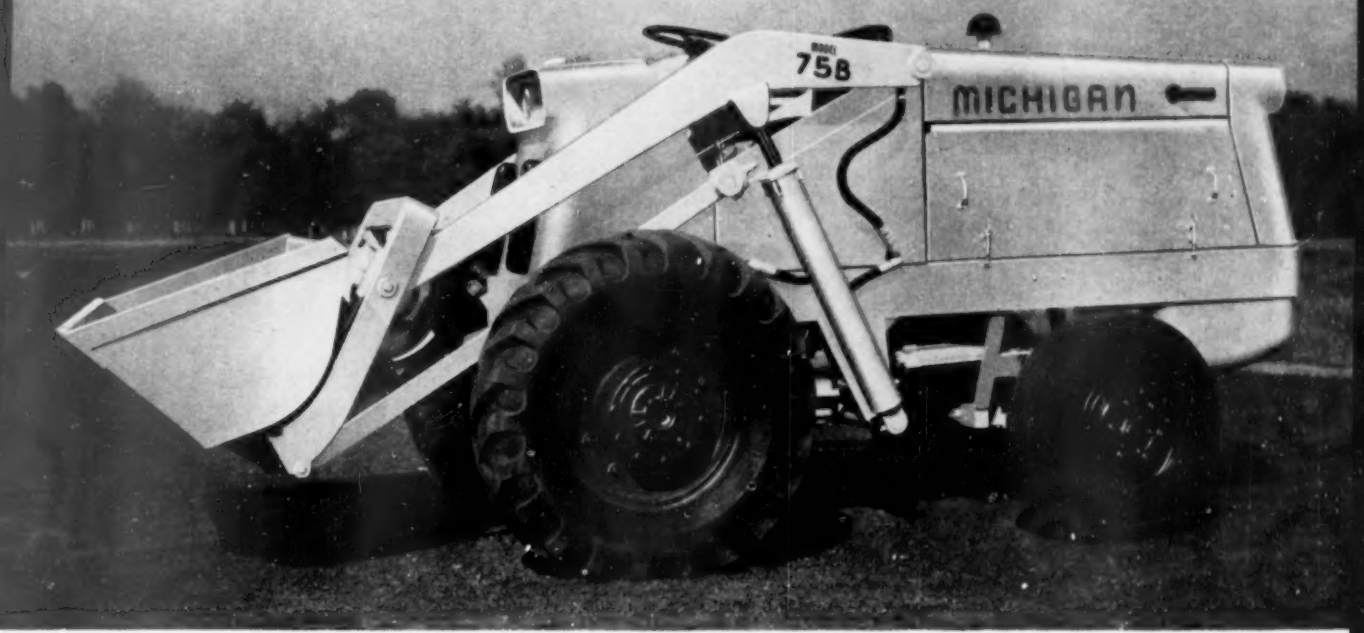
MANUFACTURERS OF SPECIAL MILLWORK: DISTRIBUTORS OF JOHNS-MANVILLE BUILDING MATERIALS; CURTIS WOODWORK

STURDYBILT PREFABRICATED, DEMOUNTABLE HOUSES

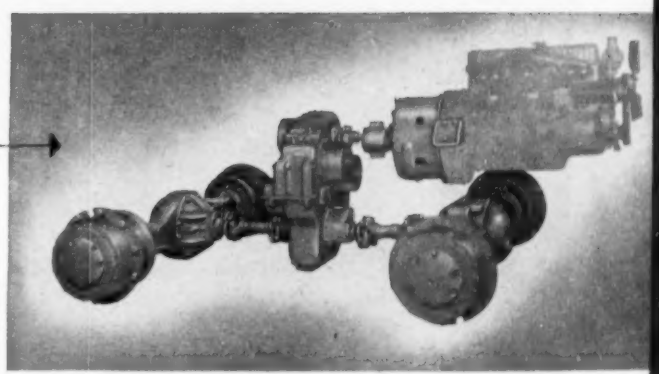
SOUTHERN MILL & MANUFACTURING CO. • TULSA, OKLAHOMA

STURDYBILT HOUSES COMPLY WITH COMMERCIAL STANDARD CS125 OF THE NATIONAL BUREAU OF STANDARDS FOR PREFABRICATED HOMES

Here's Why The **MICHIGAN** *Tractor Shovel*
WILL DO MORE WORK FOR YOU!



* *This Power Train — from engine to tires — engineered and manufactured by Clark*



* **CLARK TORQUE CONVERTER** — 3-to-1 multiplication factor provides maximum torque *when it is needed.* Precise control in inching and digging.

* **CLARK POWER-SHIFT TRANSMISSION** —no conventional clutch; four speeds forward and reverse—direction control by lever on the steering column.

* **CLARK PLANETARY DRIVE AXLE** — final reduction in the wheel reduces the torque load on all gears and shafts.

RESULT — easier operation, utmost accessibility and simplicity of servicing, highest efficiency in shovel handling.

ADD greater weight and more horsepower than any front-end loaders of comparable capacity, and you see why you can Move More with a MICHIGAN*.

*A Trademark of Clark Equipment Company

For full information send for the MICHIGAN Tractor Shovel Fact-Folio —specifications, action photos, magazine article. The coupon will bring your copy.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY, Construction Machinery Division
448 Second Street, Benton Harbor, Michigan, U. S. A.

Please send the MICHIGAN Tractor-Shovel Fact-Folio

Name _____ Title _____

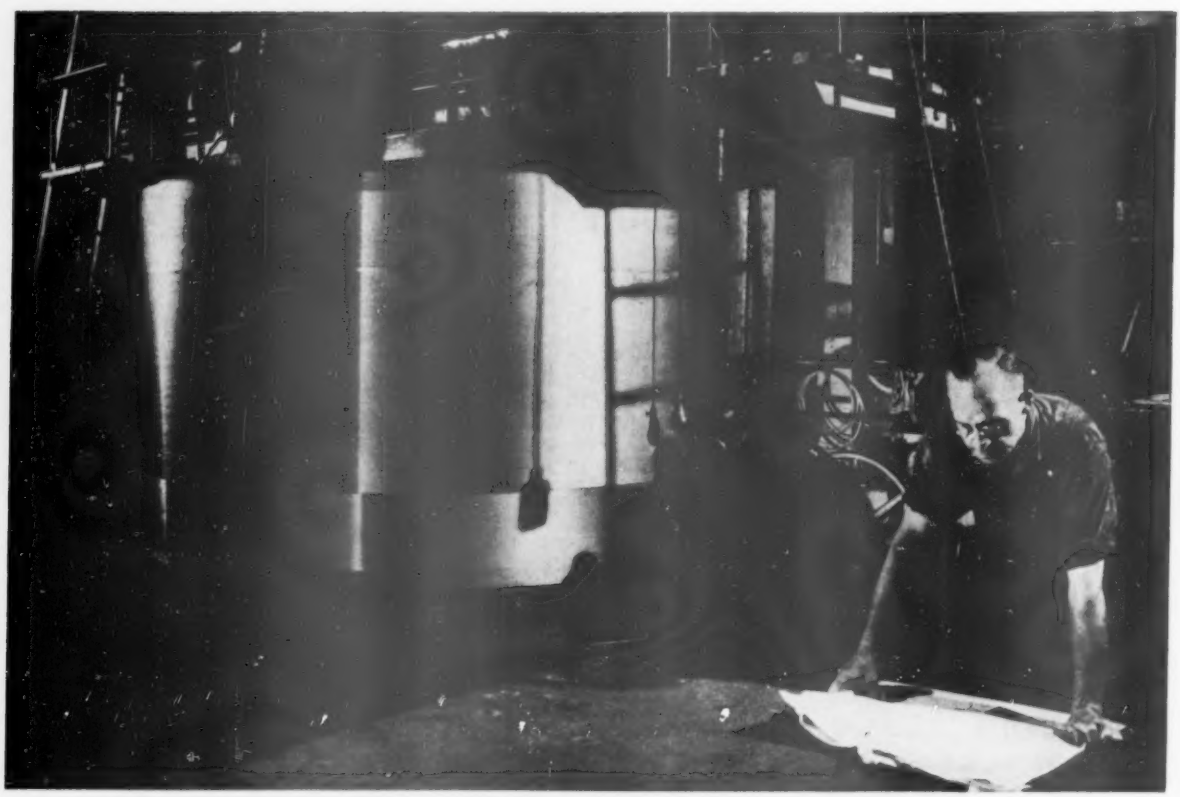
Firm Name _____

Address _____

City _____ Zone _____ State _____

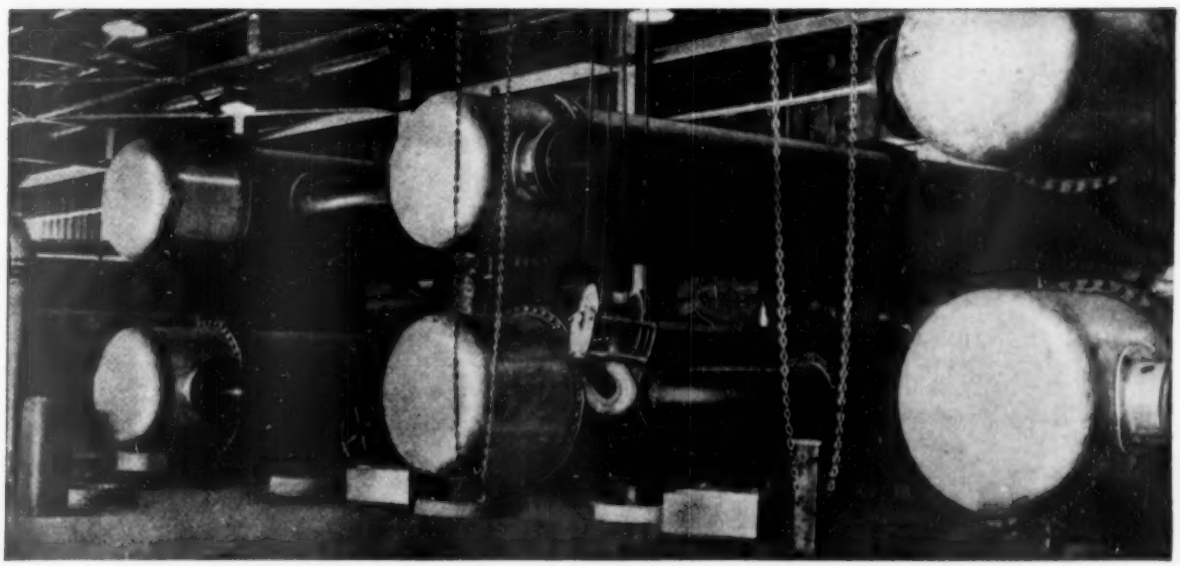
Profit-building answers to Modern

...examples of the wide variety of heavy-metal equipment designed and built by Alco to meet today's demands in petroleum and petrochemical processing . . . results of **Alco Experience** . . . gained through many years of designing and building heavy-metal equipment for refining and processing companies the world over . . . and **Alco Facilities** . . . capable of handling economically an extremely wide range of metal-fabricating operations . . . of meeting strictest customer specifications.

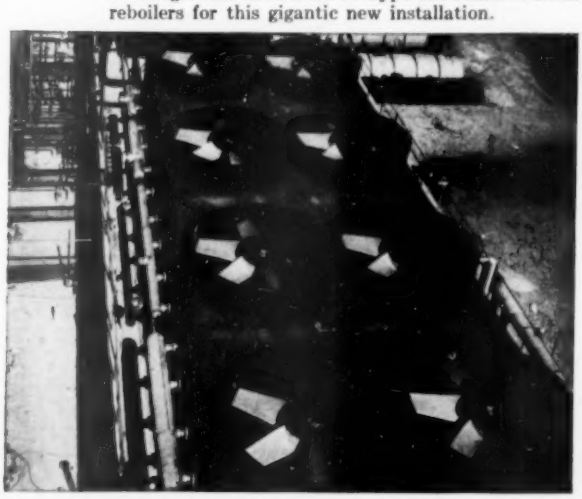


LARGE-DIAMETER BORING MILL, equipped with two rail heads and capable of handling work 25 ft 0 in. high, is typical of the complete, modern production facilities in Alco's shops which can produce virtually every type of heavy-metal equipment for the petroleum, chemical and power industries.

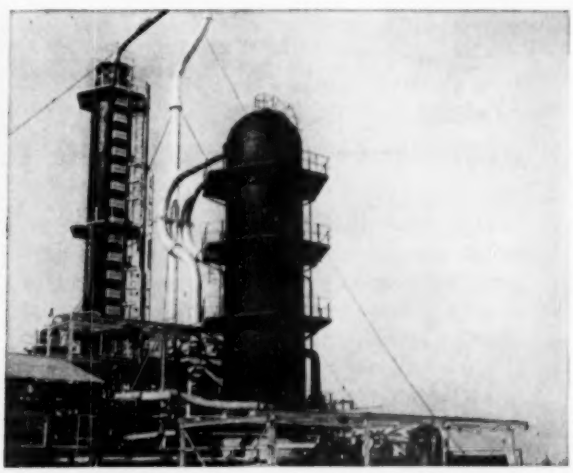
Processing problems



HEAT EXCHANGERS, built by Montreal Locomotive Works, Ltd., an Alco affiliate, ready for final piping in the Edmonton plant of The Canadian Chemical Company, Limited. Heads, tubes and tube sheets of these exchangers are fabricated of Type 316 stainless steel. MLW has supplied more than 200 heat exchangers and reboilers for this gigantic new installation.



AIR-COOLED HEAT EXCHANGERS were supplied by Alco for Celanese Corp., of America's new Pampa, Texas, plant. Mounted in 17- by 24-ft induced-draft housings, each cooling bank is equipped with two Monel fans supported on silicon rubber. Total heat dissipation from this specially engineered installation is 229,400,000 Btu per hr, a record for air-cooled condensers.

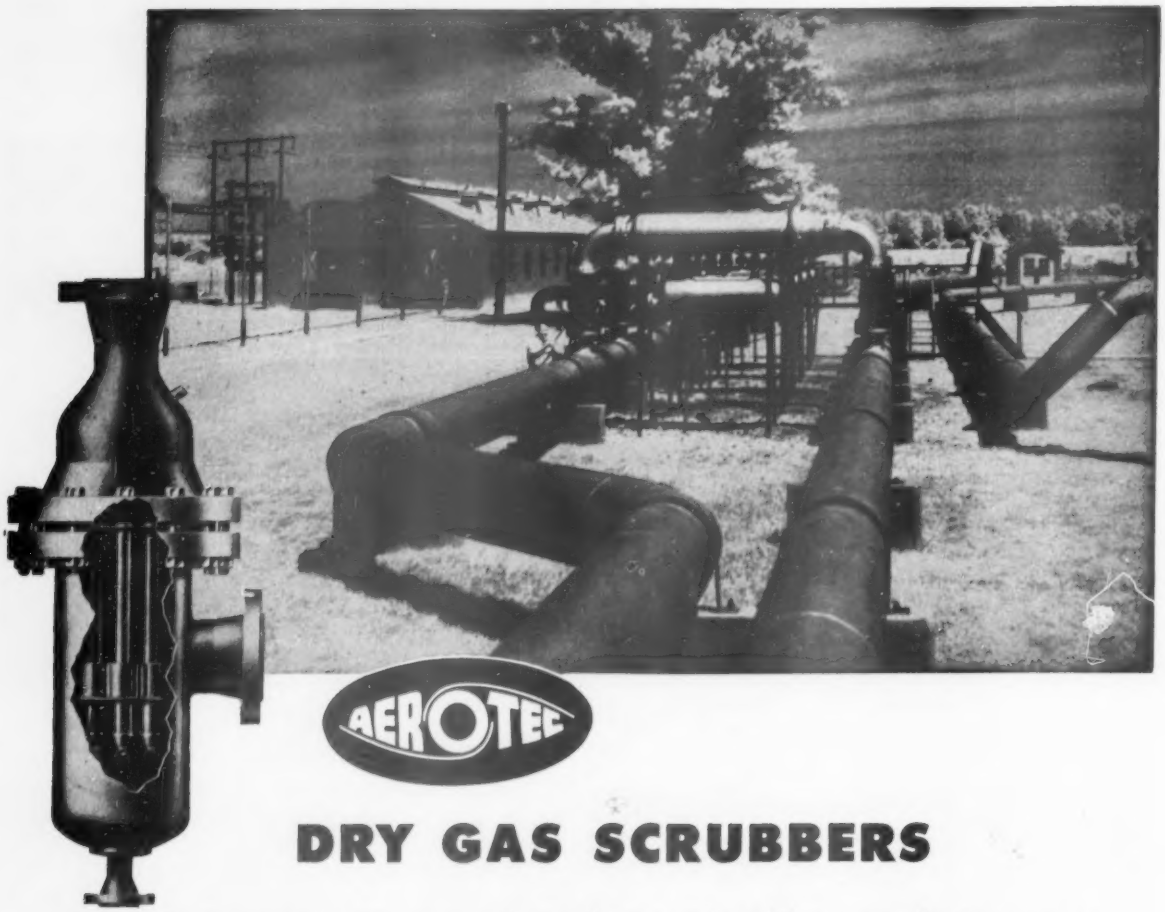


WORLD-WIDE USE of Alco equipment is typified by the wide range of Alco coolers, exchangers, condensers and heaters in service at the Aquila refinery in Trieste, Italy. Operating on Middle Eastern crudes, Aquila's annual capacity is over 900,000 tons with products including high-octane gasoline, top-quality lubricating oils and several types of asphalts and paraffin waxes.

You can find your own profit-building answers by using Alco facilities and experience on your processing problems. Contact your nearest Alco Products sales representative today. Offices in Dunkirk, New York, Chicago, Los Angeles, Kansas City, Houston, Tulsa and Beaumont.

ALCO
PRODUCTS

AMERICAN LOCOMOTIVE COMPANY • DUNKIRK, N. Y.



AEROTEC

DRY GAS SCRUBBERS

protect compressors and reduce pipeline maintenance

Dusts and distillates in natural gas put an unnecessary drag on profitable pipeline operation. Aerotec Dry Gas Scrubbers get rid of these damaging impurities with high efficiency, thereby reducing maintenance to a minimum. This is a proven fact in well and pipeline installations across the country.

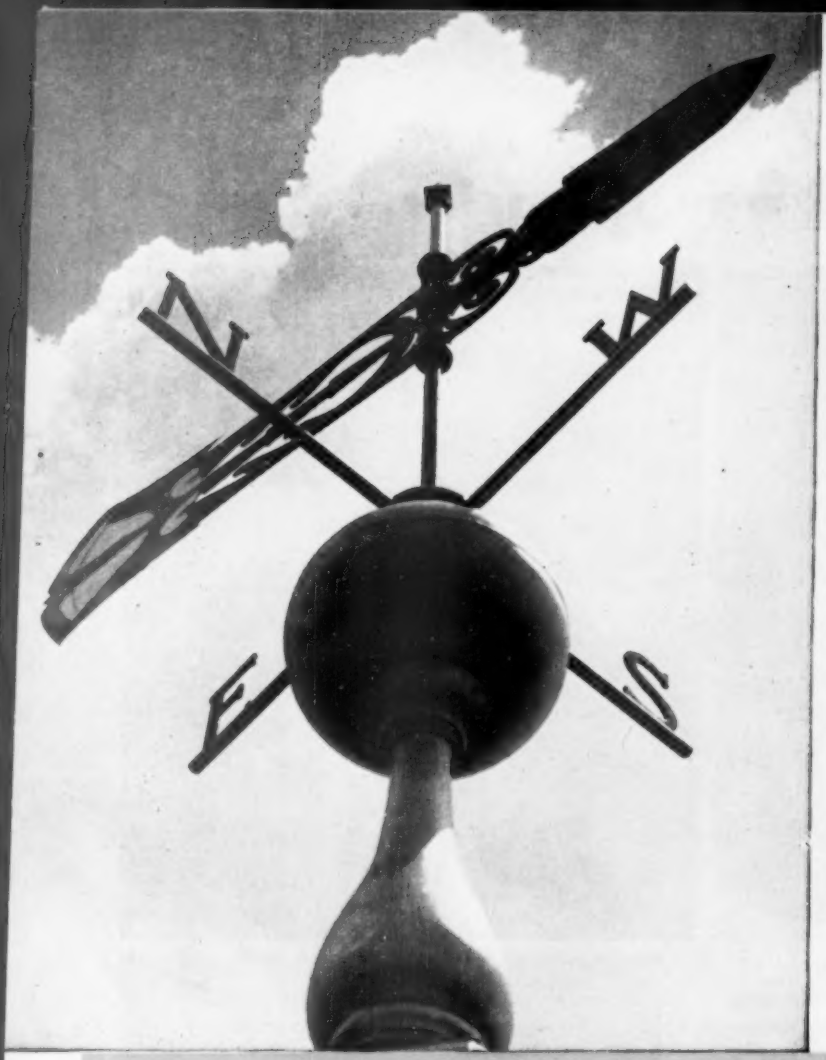
The Aerotec Scrubber, unlike conventional types, uses no liquid filtering medium. Hence, you eliminate carryover of elements that cause compressor wear. You also avoid other difficulties normally encountered with wet-bath scrubbing methods. The Aerotec units assure clean, *dry* gas that flows freely and saves on repair and maintenance costs.

Basis of this efficiency is a unique method of scrubbing gas by the use of multiple, small-diameter tubes. Through the principle of dry separation by centrifugal force, foreign solids and liquids are precipitated, leaving the gas clean and dry.

Simplified piping permits easy installation of the compact, lightweight Aerotec Dry Gas Scrubber. Standard units up to 100,000,000 SCFD are available, with larger capacity requirements met by manifolding. For technical data and engineering assistance in selecting the Aerotec Scrubber best suited to your gas-cleaning needs, call or write our representatives today.

Project Engineers **THE THERMIX CORPORATION** Greenwich, Conn.
(Offices in 38 Principal Cities)

Manufacturers
THE AEROTEC CORPORATION
GREENWICH, CONN.



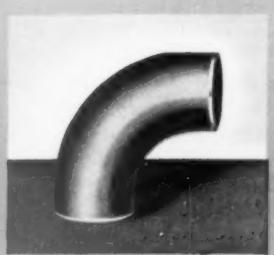
A Four-Way Selection

This photograph of a weather vane seems a good way to point out the fact that there are four different types of Midwest Welding Elbows (see below). These are more types than are manufactured by any other company. This greater selection is important to users of welded piping because it gives the engineer greater latitude in piping design and permits improvements and economies not otherwise possible in welded piping systems. For more information on this subject, ask for Catalog 54.

MIDWEST PIPING COMPANY, INC.

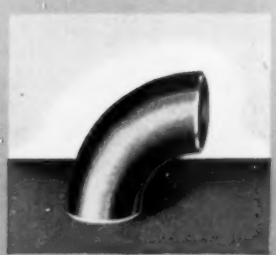
Main Office: 1450 South Second Street, St. Louis 4, Mo.
Plants: St. Louis, Passaic, Los Angeles and Boston
Sales Offices:
New York 7—50 Church St. • Chicago 3—79 West Monroe St.
Los Angeles 33—520 Anderson St. • Houston 2—1213 Capitol Ave.
Tulsa 3—224 Wright Bldg. • Boston 27—426 First St.

STOCKING DISTRIBUTORS IN PRINCIPAL CITIES



MIDWEST "LONG TANGENT"

Same radius as ASA but tangent equal to 25% of nominal pipe size on each end. Saves pipe, layout and welding time. Costs no more than ASA. Sizes to 36".



ASA STANDARD

Dimensions conform to applicable size range of American Standard for Butt-Welding Fittings. ASA B16.9. Tolerances much less than allowable. Sizes to 36".

SHORT RADIUS

Recommended where space is limited. Sizes to 30". Also available with "Long Tangents" in sizes 14" to 36".

MIDWEST REDUCING

Takes the place of a straight size elbow and a reducer. Eliminates one weld, reduces pressure drop, easier to insulate. Sizes to 16", reductions to half size.

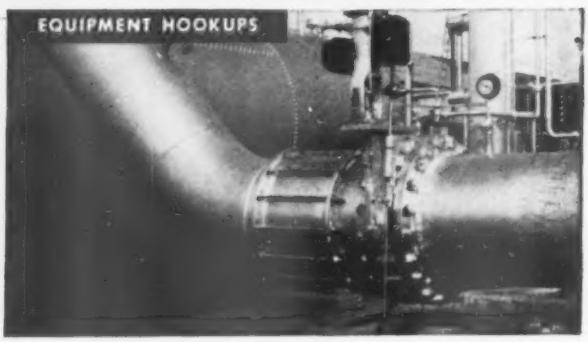
MIDWEST WELDING FITTINGS

IMPROVE PIPING DESIGN AND REDUCE COSTS

6103

IN THE OILFIELDS . . .

the DRESSER way is *easier . . . surer!*



As an oilman, you're interested in joining pipe quickly . . . maintaining tight joints . . . making fast repairs with minimum losses and shutdowns. Using Dresser Couplings and repair products, you can do just that.

Dresser Couplings or Long Sleeves go together simply and quickly. Resilient Dresser Gaskets assure flexible joints which absorb settlement, other movement . . . on well and separator piping . . . salt-water lines . . . tank, pump, engine and compressor connections.

When a split, break or leaking joint occurs, Dresser Clamps and Sleeves turn an emergency into a simple repair job—completed in a matter of minutes *without shutdowns.*

You'll find there's a Dresser product for every condition and requirement affecting oilfield pipe lines, and that the DRESSER way is *always* easier, surer.

AVAILABLE AT ALL LEADING OILFIELD SUPPLY STORES

Style 38
Coupling

Style 40
Long Sleeve

Style 63
Expansion Joint

Style 39
Insulating Coupling

Style 55
Perous Weld Clamp

ALSO COLLAR LEAK CLAMPS, HIGH PRESSURE REPAIR SLEEVES

DRESSER®

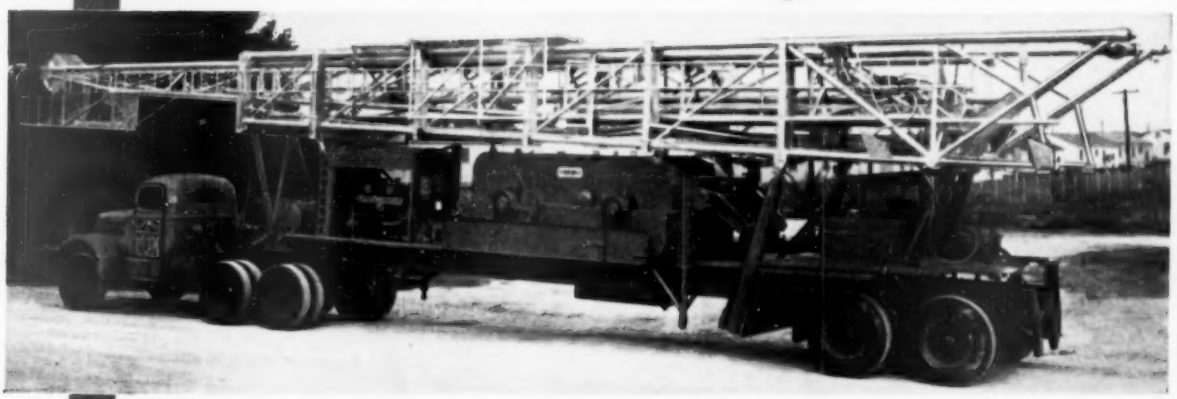
COUPLINGS

Dresser Manufacturing Division, 49 Fisher Ave., Bradford, Pa. (One of the Dresser Industries). Warehouses: 1121 Rothwell St., Houston, Texas; 101 S. Bayshore Highway, South San Francisco, California.

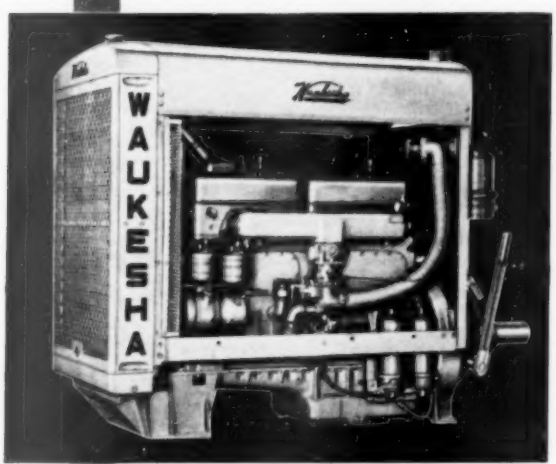
it takes

WAUKESHA *power*

for this FRANKS 6,000-foot Drilling and Spudder Rig



Here is another stand-out example of Waukesha Engine power and performance in the oil fields. Pictured above is a Franks "Comet" Model 137-DTD trailer-mounted combination slim hole rotary drilling and spudder rig, owned by the B.R.&L. Drilling Co. of Farmington, New Mexico. This 96-foot, 200,000 lb. capacity telescoping derrick, especially designed for fast mobility and portability, is powered with a Waukesha WAKU combination gas unit, shown below.

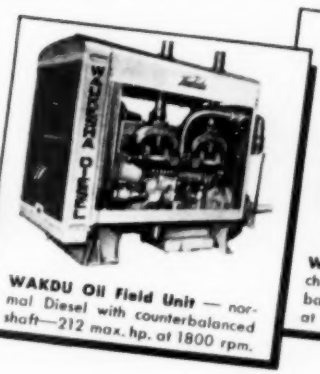


● This modern power plant is a rugged 1197 cu. in. six-cylinder, overhead valve engine, equipped with combination gas-gasoline carburetor, regulator, top cylinder oilers, water-cooled exhaust, heated intake manifold, and other accessories for oil field service. Its design and construction give a steady flow of power under full rated continuous duty load, with a big reserve for overload or emergencies. For detailed information and specifications on the popular 6-WAKU Oil Field Special, send for Bulletin 1556.

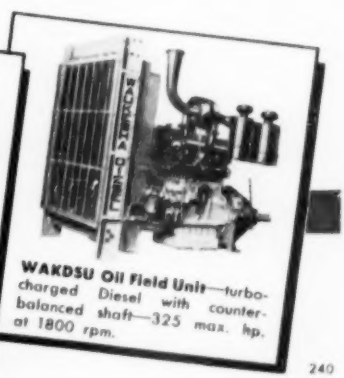
Remember—Waukesha Engines and Power Units, for every oil field service, operate on Diesel fuels, natural gas, butane or gasoline, and range from 10 hp. to 600 hp. Ask for Bulletin 1079.

WAKU Oil Field Unit—combination gas, gasoline—225 max. hp. at 1500 rpm, with standard crankshaft. (Also available as Model WAKBU, a straight gas unit, with counterbalanced shaft—275 max. hp. at 1800 rpm.)

Waukesha WAK Series includes these Diesels:



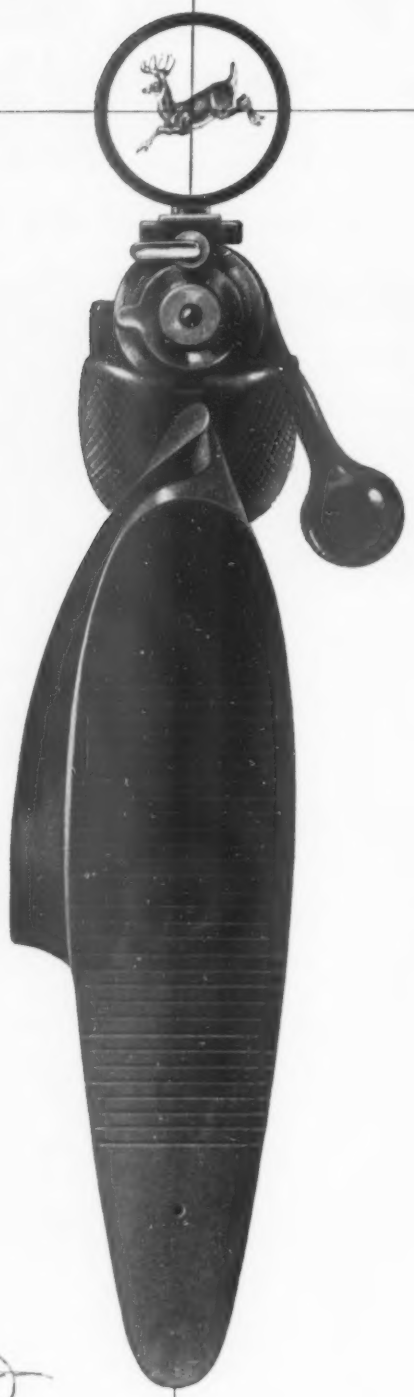
WAKDU Oil Field Unit — normal Diesel with counterbalanced shaft—212 max. hp. at 1800 rpm.



WAKDSU Oil Field Unit—turbocharged Diesel with counterbalanced shaft—325 max. hp. at 1800 rpm.

WAUKESHA MOTOR COMPANY
WAUKESHA, WISCONSIN
NEW YORK TULSA LOS ANGELES

240



FOR ACCURACY IN PERFORATING... YOUR BEST BET IS LANE-WELLS

because the Lane-Wells system of depth measurement is still the standard of the industry. The Lane-Wells measuring sheave, with built-in micrometer adjustment, and the Lane-Wells weight indicator are precision instruments. And every Lane-Wells conductor cable is individually calibrated: the operator knows, to the fraction of a foot, the cable stretch for any depth, with any load, under any set of well conditions. So, to put the shots *exactly* where you want 'em, your best bet is Lane-Wells Perforating Service.

WRITE FOR FURTHER INFORMATION

LANE WELLS COMPANY

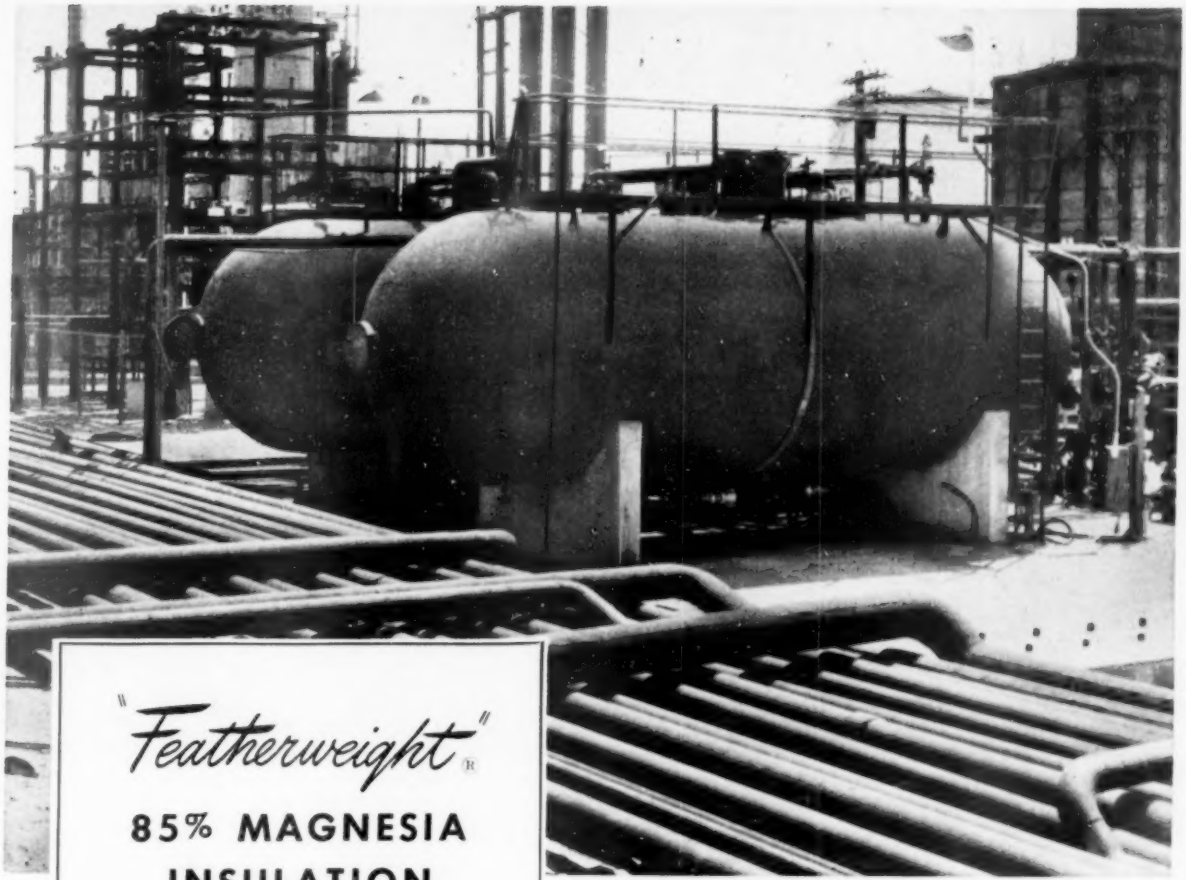
System of Depth Measure

AG-703

LANE-WELLS GENERAL OFFICES, EXPORT OFFICE, PLANT • 5610 SO. SOTO ST., LOS ANGELES 58

Tomorrow's Tools - Today!®

LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA



"Featherweight"®

85% MAGNESIA INSULATION

Desalters and piping in West Texas Refinery, insulated with "Featherweight" 85% Magnesia and covered with weatherproofing materials. Insulation contractor: Willard A. Selle Co., Inc., El Paso, Tex.

helps refinery conserve dollars

"Save heat—save money" is an operating rule that holds true for almost every industry. In the refinery illustrated here, heat is effectively conserved by the use of "Featherweight" 85% Magnesia, used to insulate various pieces of hot piping and equipment.

For any industrial insulation use, "Featherweight" proves to be a thrifty choice. By itself this material (85% basic carbonate of magnesia and asbestos fiber) has an effective insulating range up to 600°F. Used with K&M Hy-Temp Insulation, its range is extended to 1900°F.

Hy-Temp is applied directly to the hot surface, and "Featherweight" is used as the second layer. The two materials, when applied with staggered vertical and horizontal joints, eliminate heat loss which occurs on single layer installations when the expansion of hot piping and equipment causes joints to open.

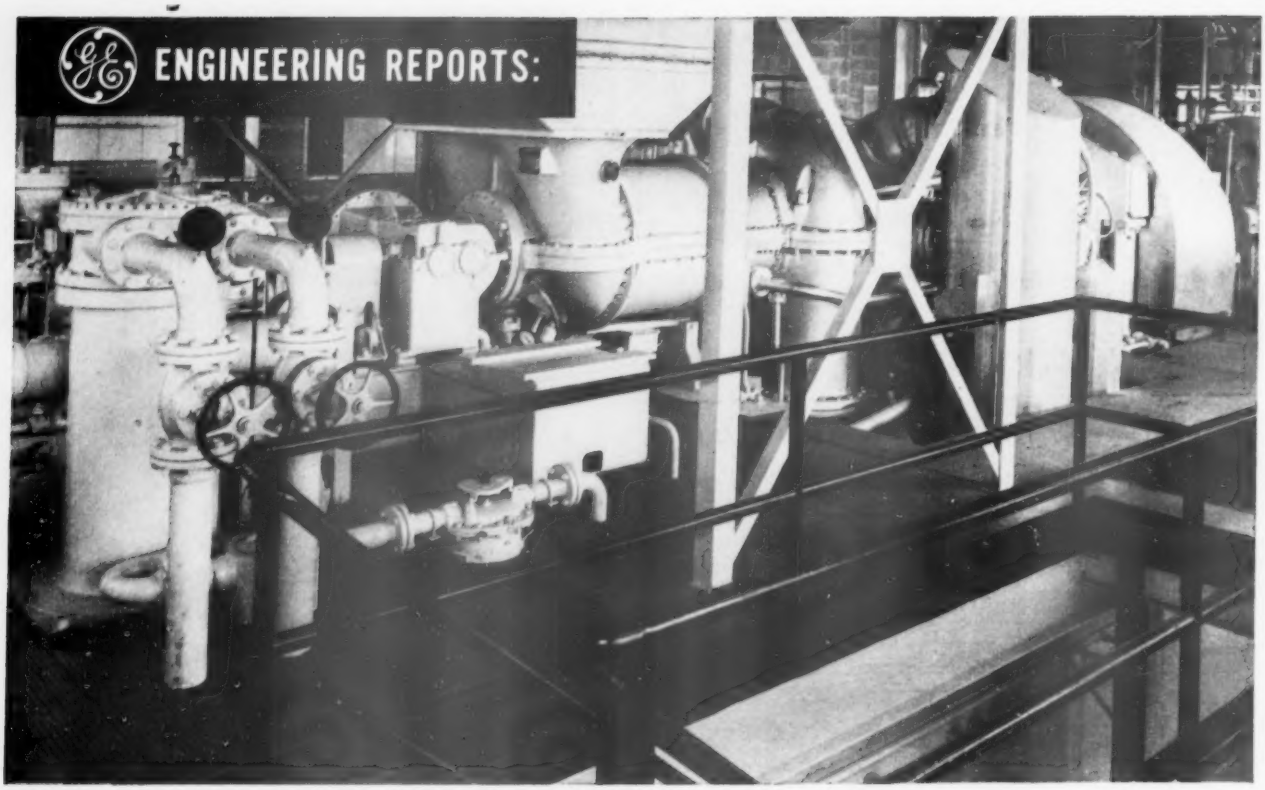
These K&M insulations will last the life of the equipment they serve, will withstand moisture, vibration, and frequent temperature change. With a waterproof jacket, they serve equally well outdoors. Both materials are supplied in various sizes and thicknesses.

Your K&M distributor is an experienced applicator who will gladly give you more information about these heat-saving, money-saving K&M insulations. Or write directly to us.

KEASBEY & MATTISON COMPANY • AMBLER • PENNSYLVANIA

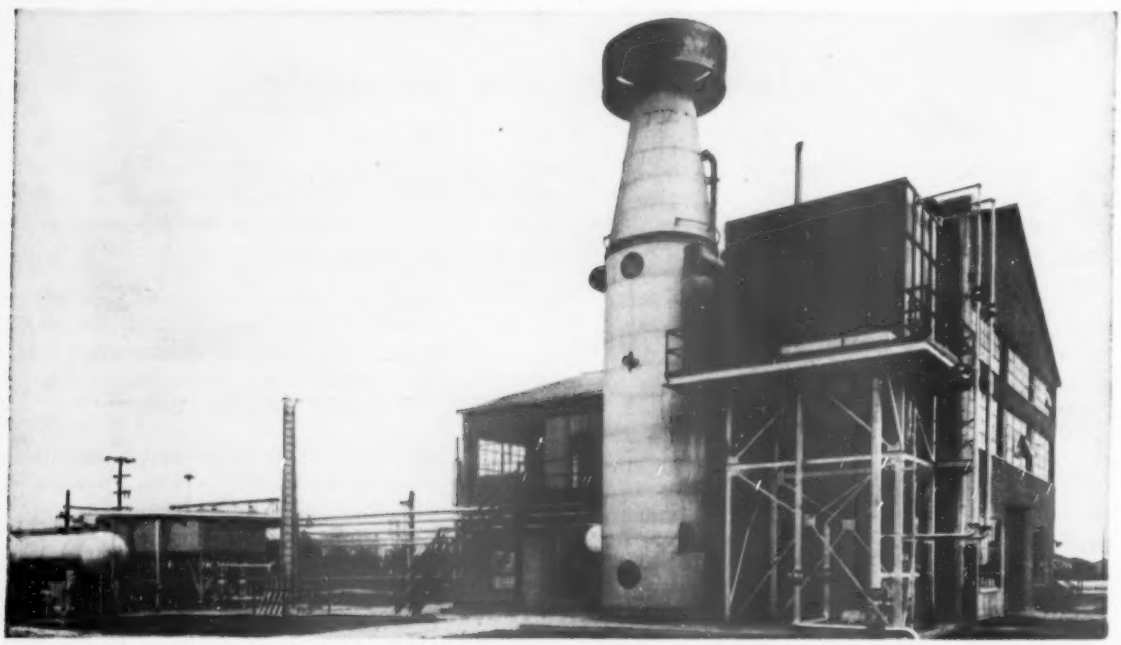
Nature made asbestos . . . Keasbey & Mattison has made it serve mankind since 1873

K&M Built in asbestos®

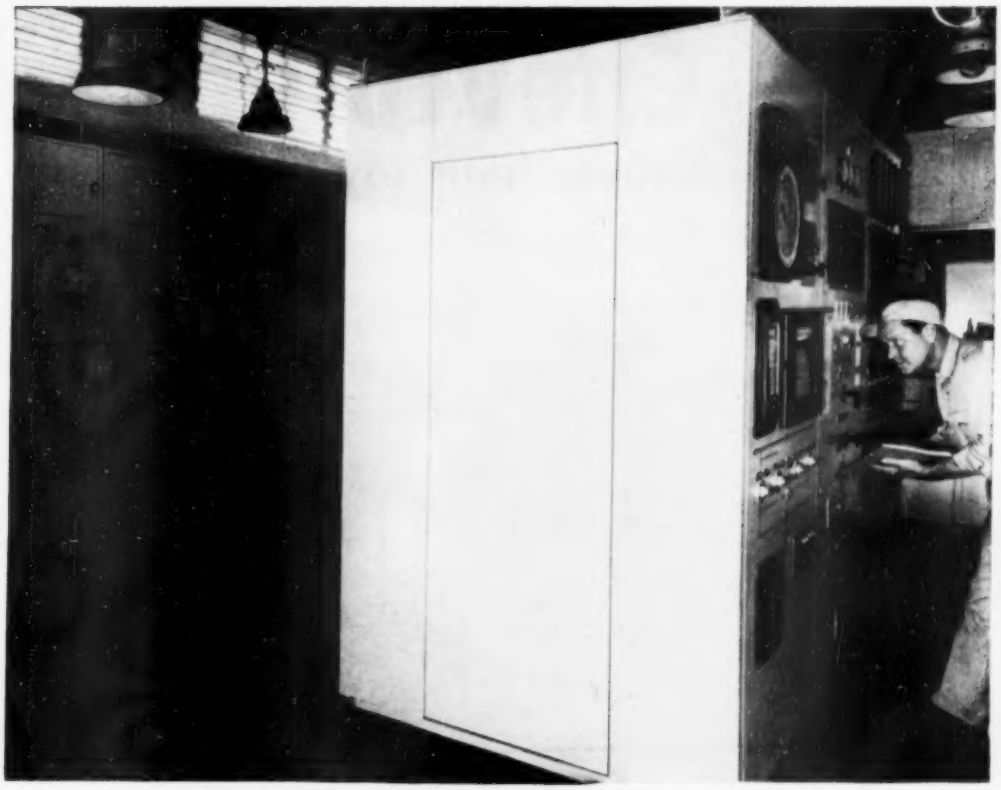


FLEXIBILITY under widely varying operating conditions is one advantage of the G-E gas turbine. It can even be operated in the desert with no cooling water required except to replace very small losses in recirculating.

G-E gas turbine helps United Gas



GREATER EFFICIENCY is provided at Napoleonville by this regenerator. Here, exhaust gases are used to heat air supply to 800 F before it enters the turbine combustion chambers to combine with the natural gas.



COMPACT, COMPLETE, CONVENIENT, the control equipment consists only of a starting and supervisory control station and an auxiliary control panel.

reach all-time day delivery peak

Pumps 510,992,000 cfd in first use of gas turbine-driven centrifugal compressor as initial main-line station

Four billion cubic feet per day of natural gas—that's the record delivery set in December, 1953 by United Gas Pipeline Co. Of this total, 510,992,000 cubic feet were pumped through United's new Napoleonville, La. station by a General Electric gas turbine.

Called in early in the planning stage, G-E engineers assisted United's engineers in the design of the main compressor building, and helped co-ordinate electric equipment with the 5700-hp gas turbine. Equipment delivery was carefully timed by G-E engineers to help complete the station on schedule. And the station has been continuously available for service since it first went on the line.

In your operation, too, a G-E gas turbine can pay big dividends.

Cuts total yearly costs. It needs fewer operators than other types of pipeline drive—only seven men are used. With few moving parts, all rotating and easily accessible, maintenance costs are low.

Provides more horsepower. It produces more horsepower in cold weather, supplying up to 25 per cent more horsepower in the winter, when demand is greatest. Rotation speed is easily changed from 2000 to 5500 rpm to meet varying load conditions. And it starts fast—in 15 minutes, automatically, at Napoleonville.

When you plan to increase gas throughput, do as United did—avail yourself early of the many specialized G-E engineering services offered through your nearest G-E Apparatus Sales representative. General Electric Company, Schenectady 5, N. Y. 601-45

Combustion Gas Turbines for the Gas Pipeline Industry—Backed by 45 years of Turbine Leadership

GENERAL ELECTRIC

New Chevrolet Trucks

deliver hour-saving power that saves you money, too!

New Chevrolet trucks bring you great new engine power in every model—from light-duty pickups to heavy-duty tractors. And this new power means important savings of both time and money on the job!

YOU SAVE TIME WITH GREATER SAFETY

That's because new Chevrolet trucks permit you to maintain faster schedules *without* driving at higher maximum road speeds. Thanks to greatly increased acceleration and hill-climbing ability, you can save time where it counts. Instead of trying to make up for lost time, you actually cut down the time lost at traffic lights and on steep grades.

YOU SAVE PLENTY ON OPERATING COSTS

New Chevrolet trucks bring you high-compression power that saves you money every mile. All three great engines—the "Thriftmaster 235," the "Loadmaster 235" and the "Jobmaster 261"* deliver greater horsepower *plus* increased operating economy. In addition, the mighty "Jobmaster 261" engine reduces the need for operating in low gears on heavy-duty jobs. As a result, you shift gears less . . . save more on gas.

Now's a good time to see your Chevrolet dealer about a time-saving, money-saving truck. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET

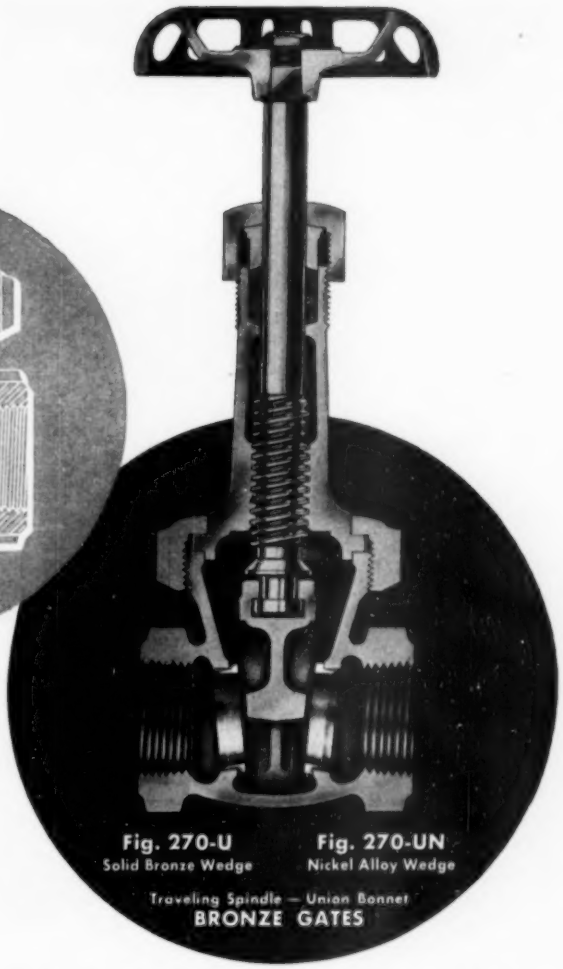
MOST TRUSTWORTHY TRUCKS ON ANY JOB!

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

THREE GREAT ENGINES—The new "Jobmaster 261" engine* for extra heavy hauling. The "Thriftmaster 235" or "Loadmaster 235" for light-, medium- and heavy-duty nauling. **NEW TRUCK HYDRA-MATIC TRANSMISSION***—offered on ½-, ¾- and 1-ton models. Heavy-Duty **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **DIAPHRAGM SPRING CLUTCH**—improved-action engagement. **HYPOID REAR AXLE**—for longer life on all models. **TORQUE-ACTION BRAKES**—on all wheels on light- and medium-duty models. **TWIN-ACTION REAR WHEEL BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—greater holding ability on heavy-duty models. **NEW RIDE CONTROL SEAT***—eliminates backrubbing. **NEW, LARGER UNIT-DESIGNED PICKUP AND PLATFORM STAKE BODIES**—give increased load space. **COMFORTMASTER CAB**—offers greater comfort, convenience and safety. **PANORAMIC WINDSHIELD**—for increased driver vision. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—easier, safer handling. **ADVANCE-DESIGN STYLING**—rugged, handsome appearance.

**Optional at extra cost. Ride Control Seat is available on all cab models, "Jobmaster 261" engine on 2-ton models, truck Hydra-Matic transmission on ½-, ¾- and 1-ton models.*

Built-in $AVING$ make JENKINS BRONZE GATES your BEST BUY

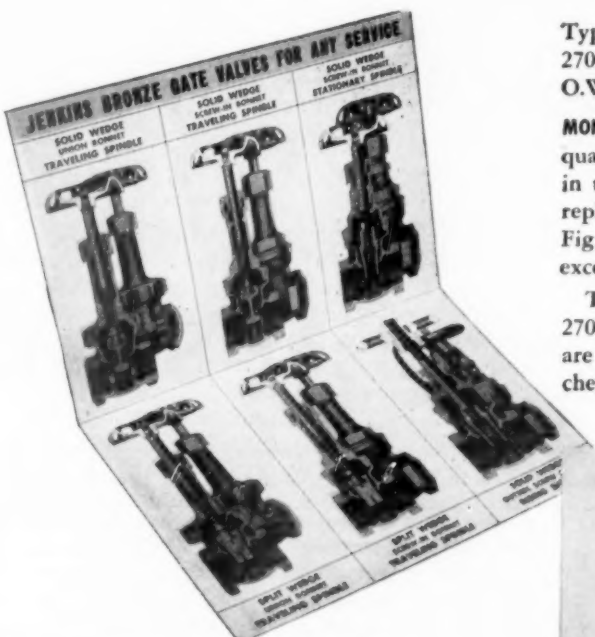


Look over any of the 35 patterns in Jenkins complete line of Bronze Gates. You'll find *savings* built into every valve. Jenkins valve specialists designed each one for easy maintenance and extra long wear. Try them on your toughest services and see why they take top-rating in any test for endurance and economy. Jenkins Bros., 100 Park Ave., New York 17.

Typical of Jenkins design for built-in savings are the Fig. 270-U and Fig. 270-UN Gates for 200 lb. Steam, 400 lb. O.W.G. services.

MONEL AND BRONZE SEATING COMBINATION In Fig. 270-U a high quality bronze wedge seats against MONEL rings expanded in the body. The wedge takes the wear — it can easily be replaced when necessary by slipping a new one on the stem. Fig. 270-UN, with a nickel alloy wedge, is recommended for exceptionally severe conditions of rapid wear and corrosion.

These and other features of rugged construction make Figs. 270-U and 270-UN first choice for economy where conditions are most destructive to valves, as in oil refineries, dye houses, chemical, food, and rubber plants.


JENKINS BRONZE GATE VALVES FOR ANY SERVICE
SOLID WEDGE UNION BONNET TRAVELING SPINDLE
SOLID WEDGE SCREW-IN BONNET TRAVELING SPINDLE
SOLID WEDGE SCREW-IN BONNET STATIONARY SPINDLE
SPLIT WEDGE UNION BONNET TRAVELING SPINDLE
SPLIT WEDGE SCREW-IN BONNET TRAVELING SPINDLE

Jenkins Bronze Gate folder shows the many types available — lists convincing reasons why they are your best buy for any service. Ask for Form 181-A.

JENKINS VALVES
LOOK FOR THE DIAMOND MARK
SINCE 1864 TRADE JENKINS MARK
Jenkins Bros.

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS

Cutting time for pipe line men

PIPE LINE MEN plan their construction schedules with confidence when they specify Basalt-Kaiser steel line pipe, because they are assured of on time delivery.

More than 24,000 carloads of Basalt-Kaiser steel line pipe have been shipped to meet the time tables of major pipeline projects across the nation during the past four years.

This unfailing dependability is possible because Kaiser Steel is an integrated operation and every phase of production is geared to meet your schedules without delay.

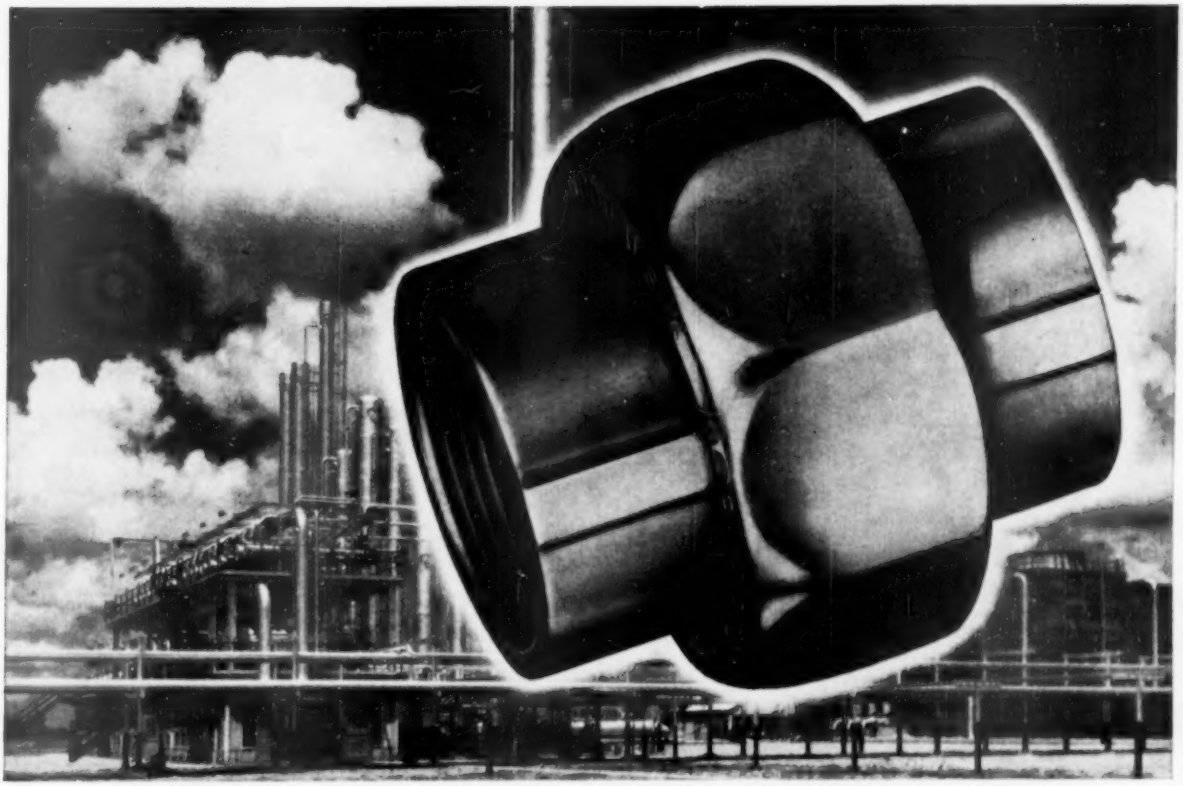
Add to this our *uniform quality, wide range of sizes,* and *prompt service* and it's clear why pipeline companies know they can rely on Kaiser Steel.

Kaiser Steel

KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	14" to 18" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅝" to 12¾" O.D.	Up to 55'	.188" to .375"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	20" to 30" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser

Prompt, dependable delivery at competitive prices • KAISER STEEL CORPORATION Los Angeles, Oakland, Seattle, Portland, Houston, Tulsa, New York



Designed Especially for the Oil and Gas Industries, Rockwood cold-forged steel Unions have been tested and listed by Underwriters' Laboratories, Inc., for use in handling flammable liquids and gases.

More Strength where you need it most!

Potential trouble spots get tops in protection when you use Rockwood Unions.

Every detail of their new design is planned to increase your safety margin and cut replacement costs. The breaking load of the 3" size, for example, is 118,000 lbs., for greater resistance to jarring, vibration, expansion and construction-shock. This extra tensile strength is evenly distributed, also, thanks to over-all balance which makes each of the three parts equally rugged.

The non-corrosive seats are double-locked in place under pressures of 100,000 and 400,000 lbs. Being integral with the Union they can't work loose. And their plug-type ball-to-cone construction eliminates sharp corners and edges. You get quick, easy alignment.

Cold forging enables making these seats of either stainless steel or Moly 341, which means no possibility of corrosion at the seat joint. In addition, all Rockwood Unions are "Rockwoodized" against corrosion by a special coating process — and absolute interchangeability of parts completes the list of solid advantages you get when you specify Rockwood Unions. For full information, write Rockwood Sprinkler Company, 104 Harlow Street, Worcester 5, Mass.

Checked For Extra Strength. Determining tensile strength is a typical feature of Rockwood's thorough quality control. Unions are taken regularly from production and tested in this machine. Average breaking loads for the 1", 2" and 3" sizes are 24,000, 82,000 and 118,000 lbs., respectively — extra strength for toughest service.

Special Non-Corrosive Seats are a big Rockwood advantage. Specify Rockwood Type 602 Union with two stainless steel seats — or Rockwood Type 603 Union with two Moly 341 seats.

ROCKWOOD

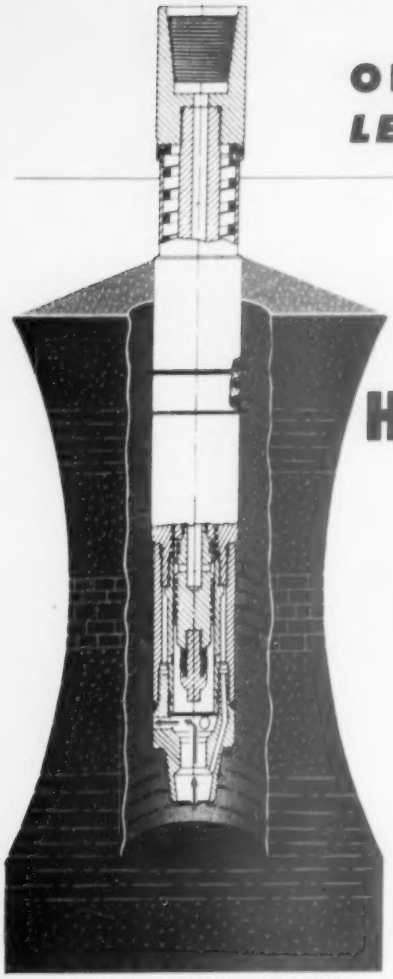
ROCKWOOD

SPRINKLER COMPANY

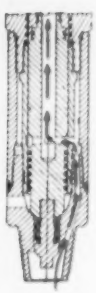
MANUFACTURERS OF THE MOST COMPLETE LINE OF STEEL UNIONS ON THE MARKET

WORCESTER 5, MASSACHUSETTS

ON BOTTOM FASTER WITH *LEAST FORMATION DAMAGE...*



GOING IN HOLE . . . TESTER CLOSED — BY-PASS OPEN



MAKING TEST . . . TESTER OPEN — BY-PASS CLOSED

HALLIBURTON'S GREAT NEW HYDRO-SPRING TESTER

and locked open by-pass

The phenomenal success of Hydro-Spring Tests is attributed in part to the Locked Open By-Pass. This important feature is especially helpful in getting packer on bottom with minimum drag or drill pipe spudding.

Pressure is equalized above and below packer at all times, until the Tester opens. This aids the packer through tight spots and helps prevent pressure buildup below that might cause formation breakdown and loss of circulation. It also reduces danger of forcing mud into test formation which could make test unsuccessful. In almost all cases the smooth, easy descent can be traced by the clean line on the pressure recording chart.

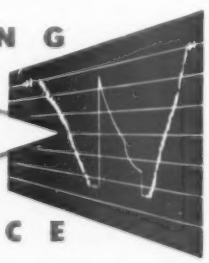
There are many good reasons why Halliburton's Hydro-Spring Test is most popular with operators. The Tester opens easily by weight of drill pipe with positive surface indication; it permits reversing above tool simultaneously with taking closed-in pressure; it can be rotated coming out of hole; it's a combination tool requiring fewer assemblies. And, the New Expanding Shoe Packer comes out of hole intact, leaving less rubber to be drilled out.

•

It's no wonder most operators agree that Halliburton's best for a drill stem test. If you haven't made the swing to Hydro-Spring, try it next. You'll save time, trouble, and money. Just phone your local or district Halliburton office. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

Hydro-Spring Tester — Patent Applied For

TESTING
HALLIBURTON
SERVICE



HALLIBURTON'S BEST FOR YOUR DRILL STEM TEST!

PETROLEUM CHEMICALS DIVISION
NEWS

April ★ One of a Series of Interest to the Petroleum Industry ★ 1954

100 BARRELS
of better public understanding

"By-the-barrel" is an unusual way to measure public relations. But we think it's appropriate in the case of the Du Pont *Magic Barrel* presentation.

So far 100 of these intriguing demonstrations have been put to work in the public relations programs of numerous oil companies and by the OIIC.

The *Magic Barrel* was developed by the Du Pont Petroleum Chemicals Division to help the oil industry explain the tremendous and growing importance of petroleum to our national economy.

The 100 barrels now in use have been featured in more than 1000 public presentations and in 29 TV shows to an estimated total audience of around 5 million people. Its reception by the general public has been overwhelmingly favorable.

Du Pont Aviation Mix Now Available with Lower Blue Dye Concentration

Color specifications for military aviation gasoline have recently been revised. To make it easier for refiners to meet the new color standards, Du Pont Tetraethyl Lead Compound — Aviation Mix — is now being made with a lower concentration of blue dye.

In the new Aviation Mix, the dye concentration is sufficient so that there is no need for suppliers of military aviation gasoline to add additional Oil Blue A when a minimum of 4 cc. of TEL is used per gallon of gasoline. In this proportion, the new mix provides a safety margin of 4% above the minimum color specifications. And when 4.6 cc. of the mix per gallon of gasoline are added, the margin of safety is increased to 20%.

Until recently, color standards furnished to refiners were solutions of oil soluble dyes in iso-octane, and were subject to fading on exposure to sunlight. New color standards, with improved light stability, have been developed through the cooperative effort of the U. S. Air Force and the Du Pont Petroleum Chemicals Division.

These standards will assist refiners in meeting the new color specifications and may be obtained by following the procedures outlined in specification MIL-F-5572.

Du Pont Marketing Services Tailored to Fit YOUR OWN Promotions

Du Pont's Petroleum Chemicals Division has developed a wide range of marketing aids and services to meet the needs of the petroleum industry.

Here are some of the ideas which are helping many oil companies get extra mileage out of their present programs:

Enhancing the selling power of your own brand name is the over-all objective of the Du Pont marketing services program.

Suppose, for example, you have built up a reputation for the heavy-duty, long-lasting features of your motor oil. You have done such a good job of selling the motoring public on these qualities that they tend to minimize the need for frequent oil changes.

How can your dealers sell the need for oil change at regular intervals — without detracting from the quality features of your motor oil?

". . . dirtied to death"

To help you overcome this problem, Du Pont developed a visual aid presentation which can be used at meetings to give dealers just the information they need. Its theme is: "Good oil seldom wears out . . . but it can become dirtied to death."

Your Greatest Asset

To help you capitalize the selling power of your name, the Du Pont Brand Name Program (suitable for larger oil companies) has provided another unique visual aid presentation. Specially designed to fit individual gasoline quality features and company marketing problems, it has proved useful for building dealer loyalty and supplying information that helps sell.

Demonstrate On-the-road Performance

Where could you find a more convincing tool for demonstrating how your

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

OVER

PETROLEUM CHEMICALS DIVISION
NEWS

CONTINUED *Marketing Services*

products perform on the road than with a specially equipped and instrumented test car?

Several of the cars in the Du Pont Fuel Test Fleet can be made available to you for this purpose—on a special arrangement basis. These cars are an ideal aid in contacting large fleet customers. And when equipped with Du Pont supplied portable chassis dynamometers, the cars are useful for dealer meeting demonstrations.

Use of the Du Pont fleet of road test cars offers a unique and convincing approach to selling big fleet customers.

When the Customer Complains . . .

Your dealers need a ready, salesman-like answer whenever they get a customer complaint about knock, poor mileage, poor starting, etc.

Whatever your merchandising program, its success generally depends on your dealers. The majority of Du Pont marketing services are, therefore, designed to help you sharpen dealer sales techniques.

To help them handle such situations, Du Pont has prepared folders that answer the most common customer complaints. Illustrated with cartoons, these pocket-size folders are written in a direct style, easy to understand and to remember.

Get the Facts

A wealth of information on how your customers buy has been made available to you through Du Pont.

The Du Pont Consumer Gasoline Buying Habits Survey—based on thousands of interviews and service station observations throughout the country—documents the motoring public's habits and preferences in buying gasoline, motor oil and TBA products. Dealer services are covered, too. This information has proved a valuable aid in planning advertising and merchandising programs.

Broad Program

These are only a few of the many helpful marketing services furnished by Du Pont. The others include a movie lending library of films of significance to the petroleum industry, a quarterly nationwide survey of competitive octane ratings, a speaker service for dealer meetings and various oil industry public relations aids.

If you are not taking full advantage of these services, be sure to contact a Du Pont Petroleum Chemicals Division representative or one of the regional offices for details.

New District Manager Named

With expanding operations in the Du Pont Petroleum Chemicals Division's Eastern Region, a district office has been created in Pittsburgh.

Afton D. Puckett, who has been serving the Pittsburgh area as a sales-service representative for the past two years, has been named manager of the Pittsburgh district.

Previous to his first assignment in the Western Pennsylvania area, Mr. Puckett was coordinator of operations of the five district laboratories of the Du Pont Petroleum Chemicals Division. In this capacity, he also supervised technical work connected with the quarterly Motor Gasoline Survey.

Mr. Puckett joined the Du Pont Company in 1947. He was at that time put in charge of studies on antiknock properties of motor fuels at the Du Pont Combustion Engineering Laboratory. After receiving a chemical engineering degree from Oklahoma A & M College in 1936, he became an engineer for the Tide Water Associated Oil Company. From 1941 to 1946 he served as fuels chemist and petroleum engineer with the National Bureau of Standards. He then worked on diesel fuel problems at the U. S. Bureau of Mines Petroleum Experiment Station at Bartlesville, Oklahoma.

AFTON D. PUCKETT

Mr. Puckett is the author of several technical papers on combustion characteristics of motor and diesel fuels.

DU PONT
REG. U.S. PAT. OFF.
Better Things for Better Living
. . . through Chemistry

Petroleum Chemicals

E. I. DU PONT DE NEMOURS & COMPANY (INC.)
Petroleum Chemicals Division • *Wilmington 98, Delaware*

Regional Offices:
NEW YORK, N. Y.—1270 Ave. of the Americas — Phone COlumbus 5-3620
CHICAGO, ILL.—8 So. Michigan Blvd. — Phone RAndolph 6-8630
TULSA, OKLA.—1811 So. Baltimore Avenue — Phone Tulsa 5-5578
HOUSTON, TEXAS—705 Bank of Commerce Bldg. — Phone PRestan 2857
LOS ANGELES, CALIF.—612 So. Flower St. — Phone MAdison 1691

IN CANADA: Canadian Industries Limited—Toronto, Ont.—Montreal, Que.—Calgary, Alta.
OTHER COUNTRIES: Petroleum Chemicals Export—Nemours Bldg., 6539—Wilmington 98, Del.

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

A-7003

Printed in U.S.A.

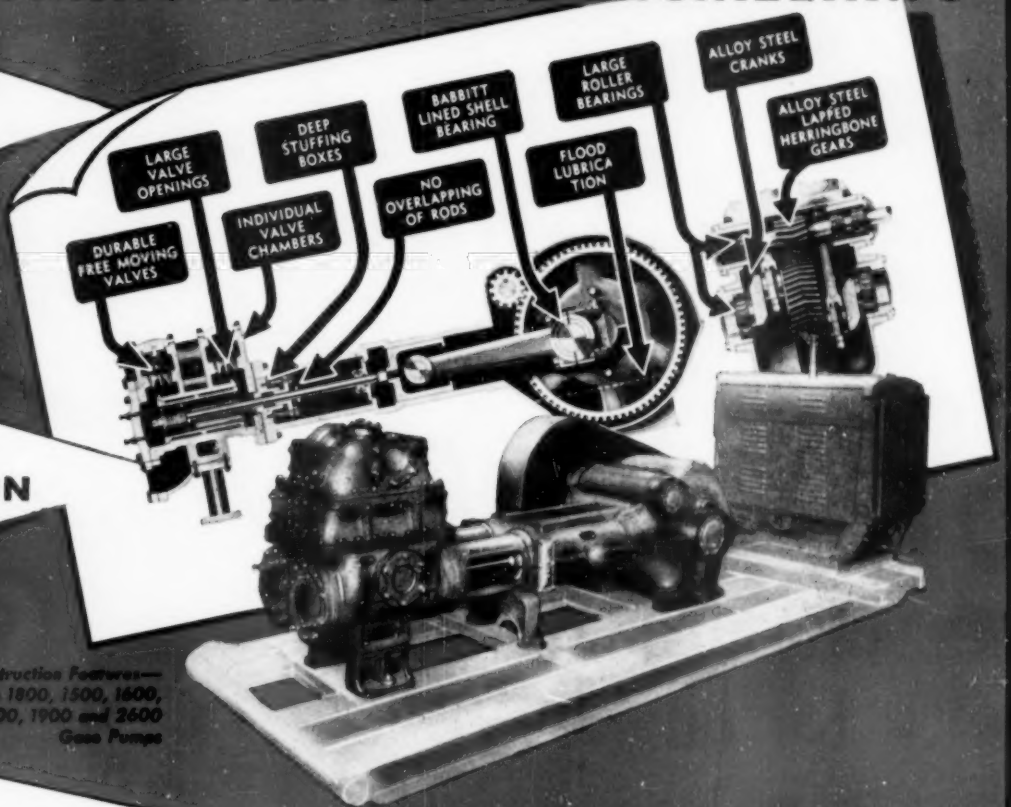
3-D PERFORMANCE

STARTS WITH SOUND ENGINEERING

DEPENDABLE OPERATION

DURABLE CONSTRUCTION

DRAMATIC SAVINGS



Typical Construction Features—Series 1800, 1500, 1600, 1700, 1900 and 2600 Gaso Pumps

Pipe line men with their technical background know that 3-D pump performance is never accidental. The Gaso combination of Dependability, Durability, and Dramatically low operating costs is the direct result of engineering geared to the principle of fewer parts made extra-strong to withstand the most rugged conditions of service for unbelievably long periods of time. Let us send you our latest catalog.

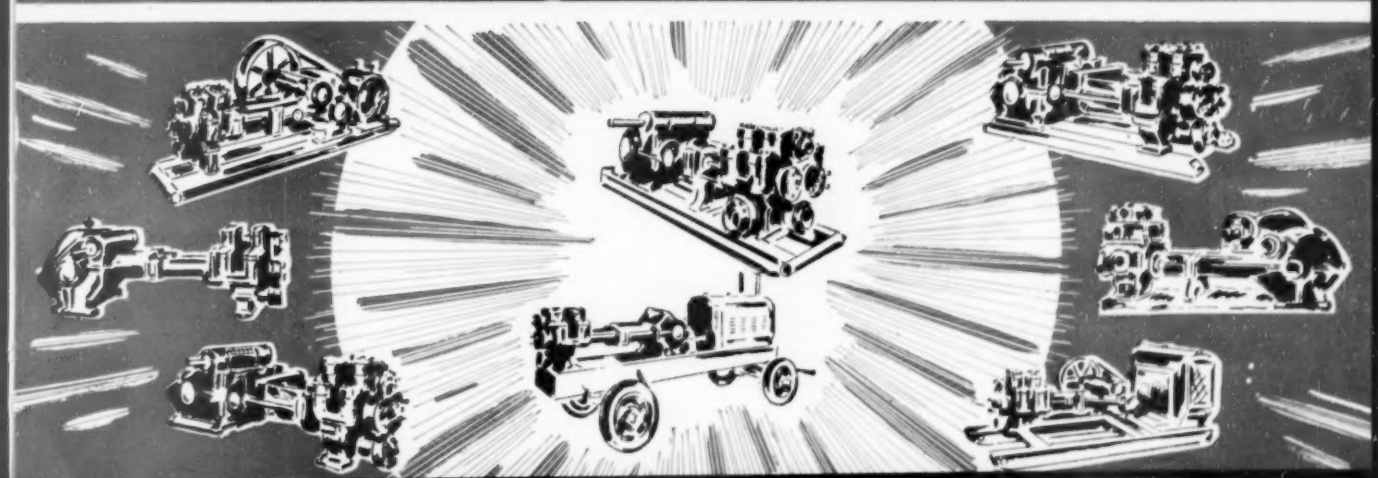
GASO PUMP & BURNER MFG. CO.

TULSA, OKLAHOMA

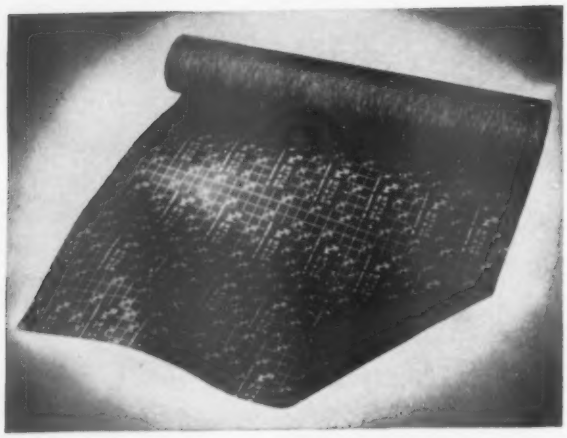
EXPORT OFFICE: 149 Broadway, New York

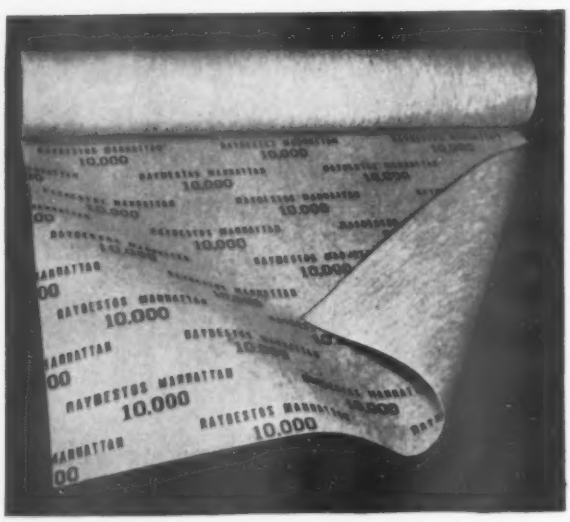
LUFKIN MACHINE CO., Ltd., Edmonton, Alberta
W. L. SOMNER COMPANY, Shreveport, Louisiana
Tinsley, Mississippi • Brookhaven, Mississippi • Odessa, Texas
BUDA ENGINE & EQUIPMENT CO., Los Angeles, Calif.
Long Beach, Calif. • Bakersfield, Calif.
PEDDLERS, INC., Houston, Texas
NORTEX ENGINE & EQUIPMENT CO., Wichita Falls, Texas

GASO PUMPS for every oil industry need



R/M K-68
and
R/M 10,000
are custom-built for oil service





These two compressed asbestos gasket sheets are outstanding examples of R/M's ability to meet the sealing needs of the petroleum industry.

R/M K-68 is a compressed sheet of specially selected asbestos fibers, bonded together under great pressure, with a binder that makes it highly resistant to petroleum oils at high temperatures. Its outstanding feature is its non-cold-flow characteristics. When immersed in oil, K-68 has a positive measured swell of less than 15%, and its tensile strength remains between 90 and 100% of the original value. It is recommended particularly for equipment handling light petroleum fractions at high temperatures.

R/M 10,000, developed for narrow flange gaskets serving under extra pressure, is also recommended for heat exchangers, condensers, and high-pressure stills. The tensile strength of this gasket is 10,000 psi. It is the strongest compressed asbestos sheet produced. It can be used where ordinary sheets will tear or blow out.

For complete information on all R/M packings and gaskets for oil field, pipeline and refinery service, see your authorized R/M distributor.

R/M MAKES A COMPLETE LINE OF PACKINGS AND GASKETS—AVAILABLE FROM YOUR R/M DISTRIBUTOR

R/M PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, MANHEIM, PA.

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; No. Charleston, S.C.; Passaic, N.J.; Neenah, Wis.; Crawfordsville, Ind.; Peterborough, Ontario, Canada.

RAYBESTOS-MANHATTAN, INC., Packings • Asbestos Textiles • Industrial Rubber, Engineered Plastic, and Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Bowling Balls

IN SWAMP
— ON DRY LAND
— SMALL OR LARGE
INSTALLATION

PURCHASED

Electric Power

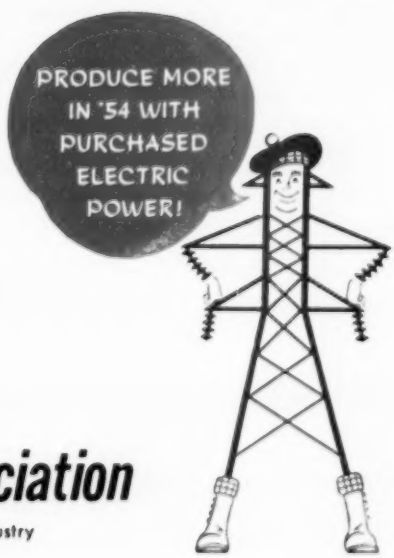
DOES IT

Cheaper

For economical, dependable, practically maintenance-free motive power the industry is relying more and more upon Purchased Electric Power. In literally thousands of installations . . . . in such diverse localities as these . . . . Purchased Electric Power furnishes dependable 24-hour-a-day service at LOWEST POSSIBLE COST!

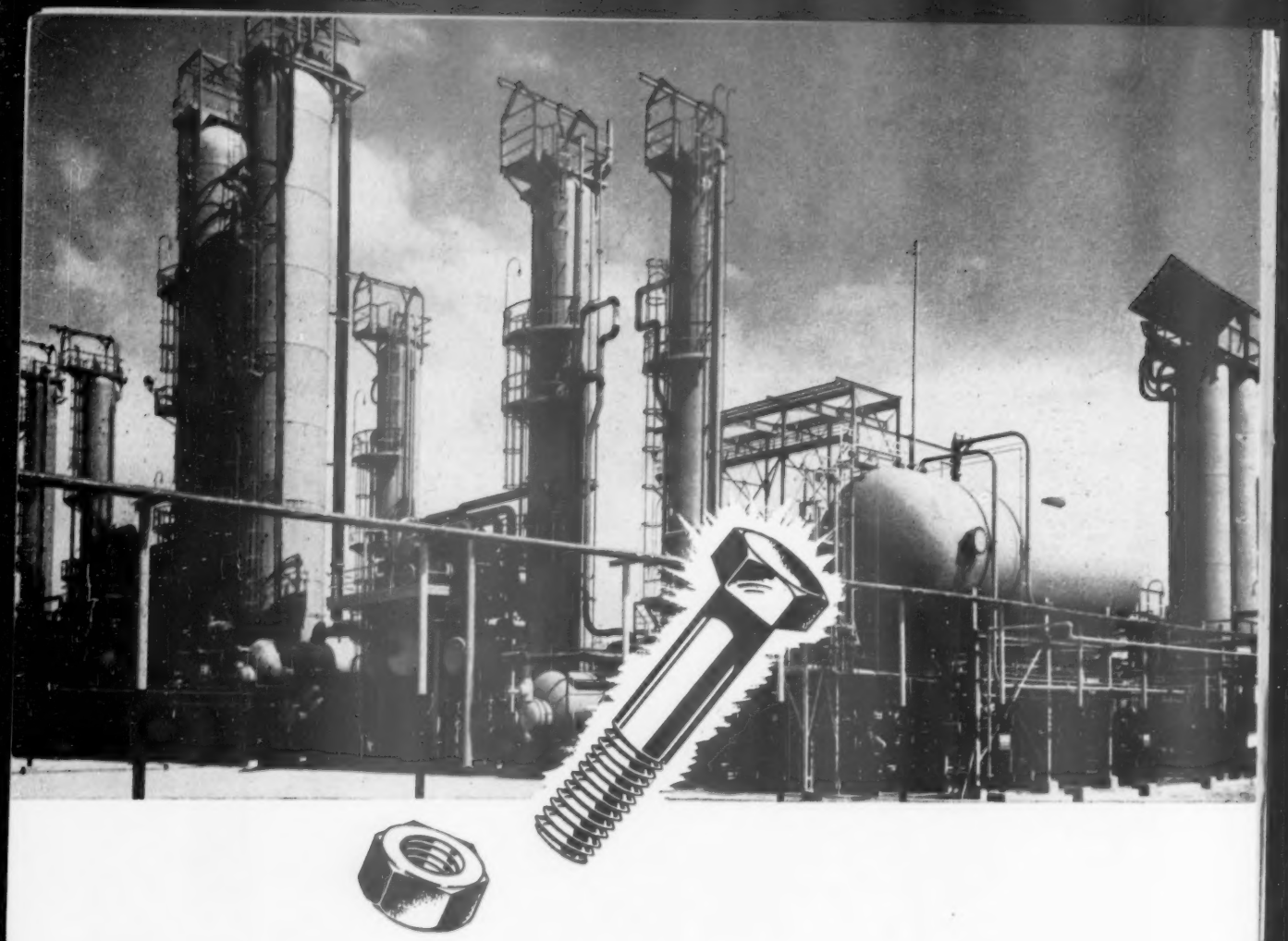
Let Purchased Electric Power go to work for *you!* There's a Power Engineer at your nearest Electric Power Company who can give you the answer to all your power problems. Why not get in touch with him today?

CALL YOUR NEAREST ELECTRIC SERVICE COMPANY **for more facts, or address your request to P. O. Box 2771, Dallas, Texas**



Petroleum Electric Power association

ORGANIZED in the interest of greater service to the petroleum industry



Right down to the last Nut and Bolt

ARTHUR G. MCKEE & COMPANY are organized to take complete responsibility for *all details* of your project from the preliminary planning stage through complete construction—literally down to the last nut and bolt.

The advantages of this undivided responsibility are manifold. You are relieved of the necessity of hiring technical help and field crews, of negotiating with numerous sub-contractors and suppliers, of co-ordinating activities and arrival of materials, of time-keeping, supervision, inspection and countless other details.

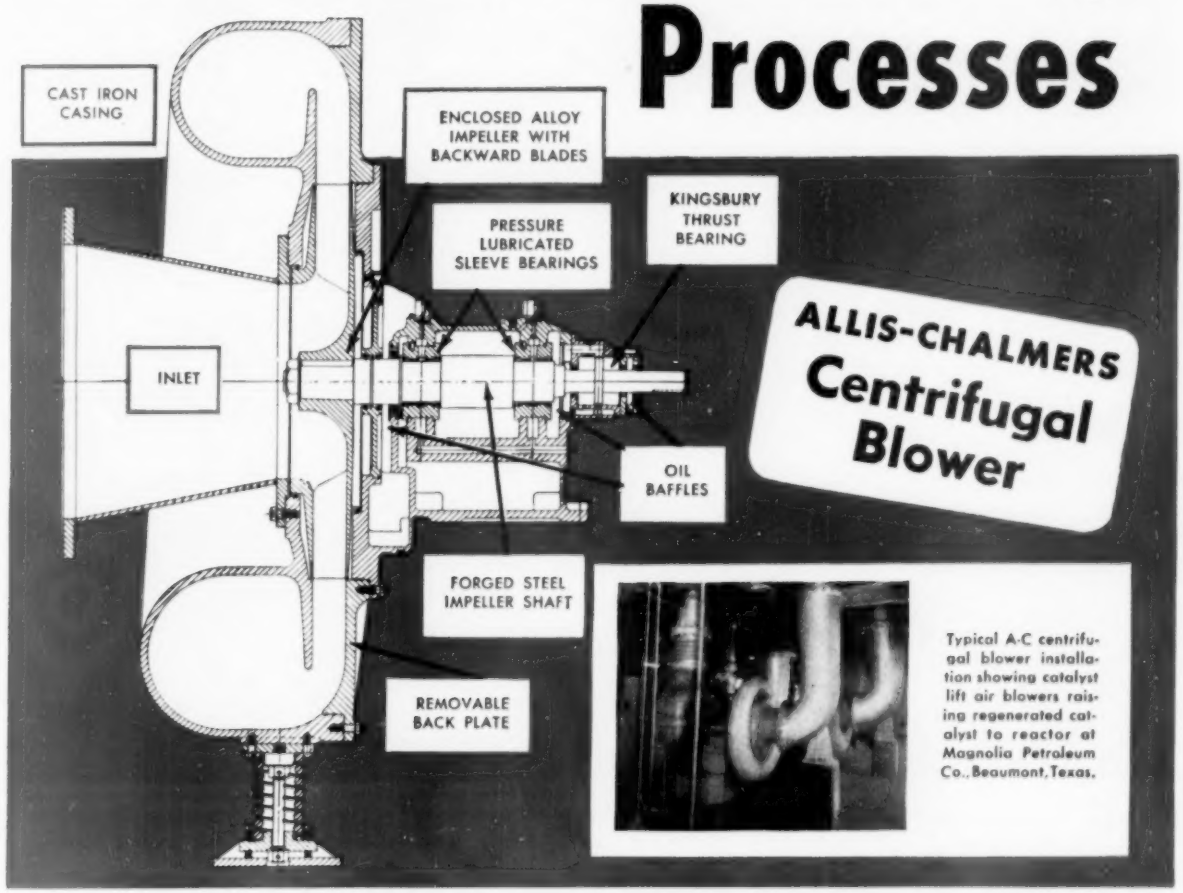
McKee performs all these functions under a ***single contract*** and with a thoroughness and efficiency born of long, specialized experience.

Arthur G. McKee & Company • Engineers and Contractors

Headquarters: McKee Building • 2300 Chester Avenue • Cleveland 1, Ohio
Offices: New York • Tulsa, Oklahoma • Union, N. J. • Washington, D. C.
British Representatives of Metals Division: Head, Wrightson & Co., Limited
Canada: Arthur G. McKee & Company of Canada, Ltd., 350 Bay St., Toronto

McKee Engineering Services

Air for New Cracking Processes



Typical A-C centrifugal blower installation showing catalyst lift air blowers raising regenerated catalyst to reactor at Magnolia Petroleum Co., Beaumont, Texas.

To meet this nation's ever-increasing demands for premium and aviation gasolines, more efficient cracking methods are being devised. Allis-Chalmers centrifugal blowers are a vital part of these new fluid processes.

At refinery after refinery, Allis-Chalmers units are withstanding the requirements of continuous operation . . . providing maximum dependability under every condition.

The cross-section drawing above shows some of the outstanding features of a typical Allis-Chalmers blower. The totally enclosed, all-welded alloy steel impeller offers highest efficiency, and backward flow design provides outstanding pressure and volume characteristics.

High strength and long life are assured by all-welded alloy steel impeller construction and pressure lubricated sleeve and thrust bearings. Cast iron casing increases rigidity and decreases noise level.

You can benefit from Allis-Chalmers wide experience in building and applying blowing equipment in the petroleum industry. For detailed information call your nearest A-C sales office, or write Allis-Chalmers, Milwaukee 1, Wis.

A-4234

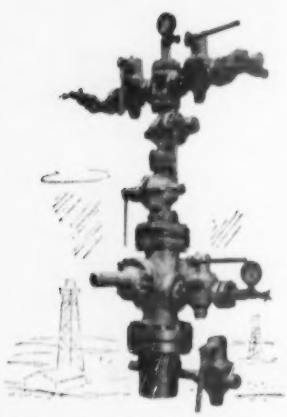
ALLIS-CHALMERS

Texrope is an Allis-Chalmers trademark.

Power, Electrical, Processing Equipment for Petroleum Industry

Goetze V-Tite Gasket being installed on flange of new Space Saver Blowout Preventer, designed and manufactured by Cameron Iron Works, Inc., Houston, Texas.

Goetze Gaskets safeguard critical points under severe pressures



Christmas Tree made by Cameron Iron Works, Inc., is equipped with Goetze V-Tite gaskets to provide safe, tight sealing for every joint.

The new "Space Saver" Blowout Preventer made by Cameron Iron Works, Inc., of Houston, Texas, weighs only half as much as earlier equipment and takes only one-half the space. This improved design permits rig platforms to be smaller, makes possible savings on handling and materials.

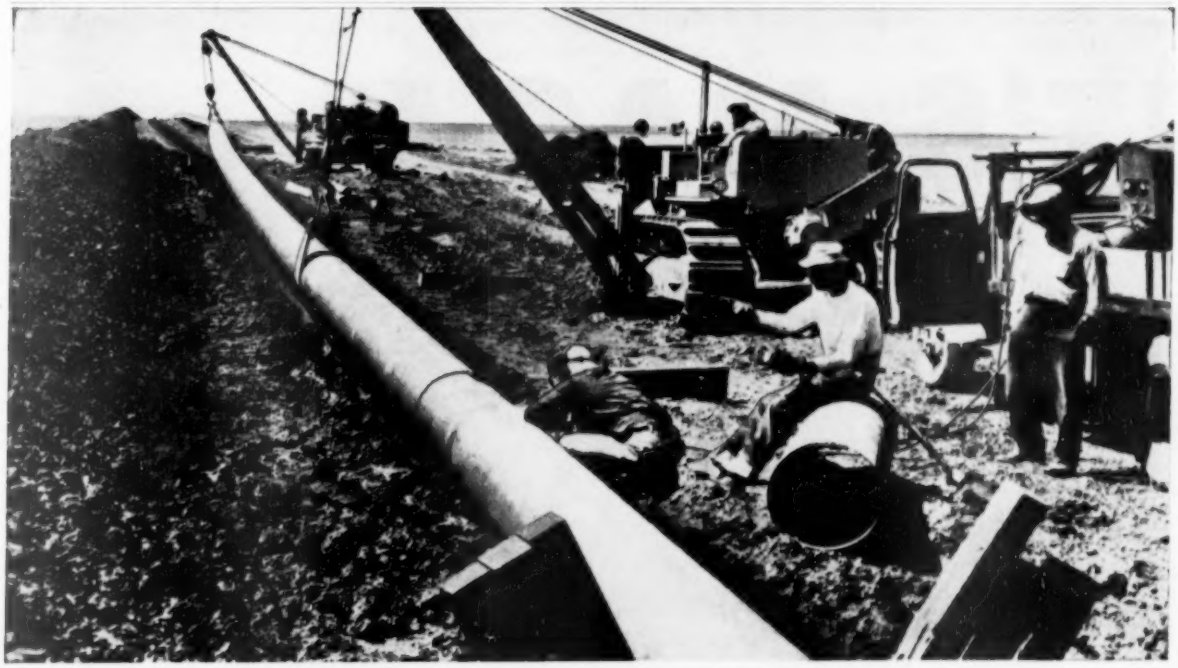
For this new equipment Cameron chose Goetze V-Tite Gaskets to do the critical job of sealing Ring-Joint flanges. These precision-made gaskets withstand the high pressures encountered in oil and gas production. Goetze V-Tite Gaskets are fabricated to extremely close tolerances to secure perfect matching of rings with flange joints. They are carefully heat-treated to keep hardness below the maximum allowable. This assures proper flow of the gasket without damage to flange surfaces and reduces the necessity for undue bolt stresses.

Both standard cross-sectional shapes, the oval (Style 950) and octagonal (Style 951), seal tightly at low bolt stresses. Made to ASA-API standards, they are supplied in metals and alloys offering maximum resistance to service and temperature conditions. In addition to the ASA-API sizes, special sizes ranging from one inch to seven feet pitch diameter are available. Catalog PK-35A gives details, sizes and engineering data. Write for it to Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay St., Toronto 1, Ontario.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville GOETZE GASKETS

PIPE LINE PROGRESS



A string of A. O. Smith line pipe on location during construction of the Interprovincial-Lakehead pipe line.

24-inch looping project to increase Interprovincial pipe line crude capacity

About 135 miles of 24-inch A. O. Smith line pipe is currently being lowered in to loop Saskatchewan and Manitoba section of 16-inch pipe in the Interprovincial Pipe Line. This will add capacity to a transmission system which, by December, will carry western Canadian crudes from the Edmonton, Alberta, area to Sarnia, Ontario.

Upon completion, this will be the world's longest crude oil pipe line, totaling 1738 miles from Redwater to Sarnia.

All the 20-inch and 18-inch pipe in the original line, presently terminating at Superior, Wisconsin, is A. O. Smith pipe. The 20-inch main runs from Edmonton to Regina; the 18-inch completes the run from Gretna, Manitoba . . . just north of the U. S. boundary . . . to Superior.

The present 24-inch installations are part of extensive looping of the 16-inch sector joining the 20 and 18-inch section.

Shipments were made from both Milwaukee and Houston mills, in supplying Interprovincial. A. O. Smith takes pride in its ability to meet delivery schedules, anywhere on this continent, with its high quality, internally expanded, welded line pipe.

A. O. Smith Line Pipe is available in a complete range of sizes and wall thicknesses, from 8⅝-in. to 36-in. diameters.

FIRSTS **by A. O. Smith: Welded line pipe • Internally expanded pipe • Light-wall large-diameter pipe • World's largest producer of large-diameter welded steel pipe.**

The A. O. Smith Casing Mill is operating at capacity to supply vitally needed casing for the Oil and Gas Industry.

A. O. Smith

CORPORATION

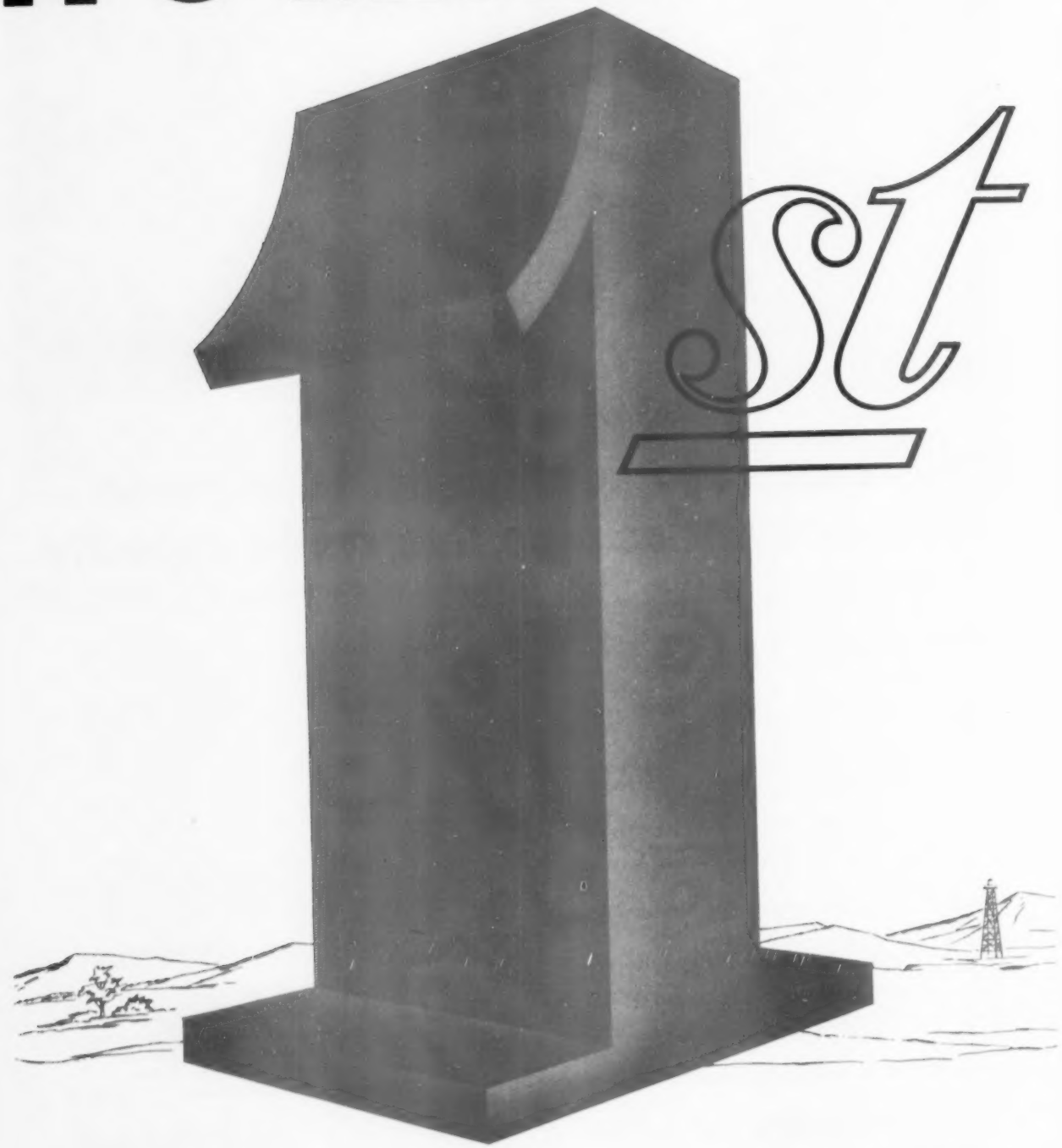
LINE PIPE • CASING

Chicago 4 • Dallas 2 • Denver 2 • Houston 2
Los Angeles 22 • Midland 5, Texas • New Orleans 12
New York 17 • Pittsburgh 19 • San Francisco 4
Seattle 1 • Tulsa 3 • Washington 6, D.C.

International Division: Milwaukee 1

DEPENDABILITY** through **RESEARCH** and **ENGINEERING

AGAIN...
IT'S MACK



Complete figures for 1953, compiled by the Automobile Manufacturers Association, show that Mack leads all other manufacturers in sales of diesel-powered trucks and tractors.

There must be reasons—and there are! *Unparalleled fuel economy and reliability* of the Mack Thermodyne® Diesel engine—as revealed by the truly amazing in-service records attested to by important operators all over the country . . . Plus acceptance of the Mack line of heavy-duty trucks, the *only completely new line of trucks* introduced since World War II.

That's why, more and more, the swing is to Mack diesels—for the big savings they give in more miles per gallon, less down-time and stand-out performance.

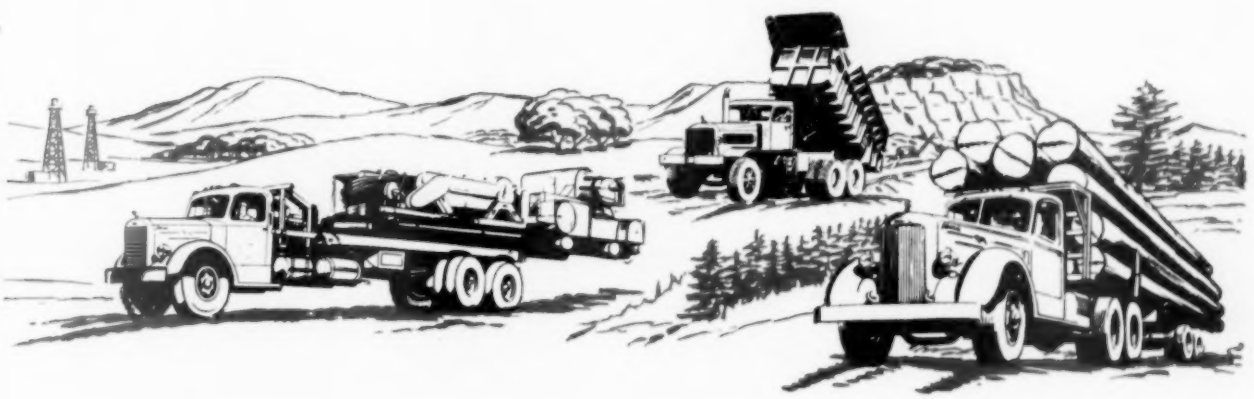
Let us refer you to users of the Mack Thermodyne Diesel whose operating conditions are similar to your own.

IN DIESEL TRUCK SALES

Mack TRUCKS

what Mack Diesels are doing for other operators...large and small...they can do for you

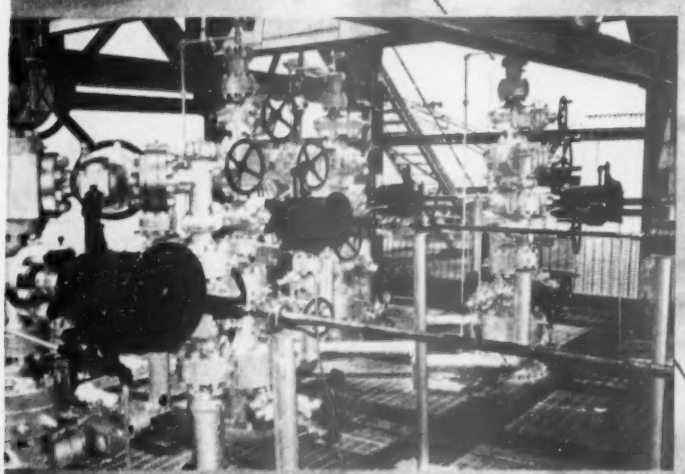
Mack Trucks, Empire State Building, New York 1, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.



for that big one off shore

E-I-M

stands the Test...



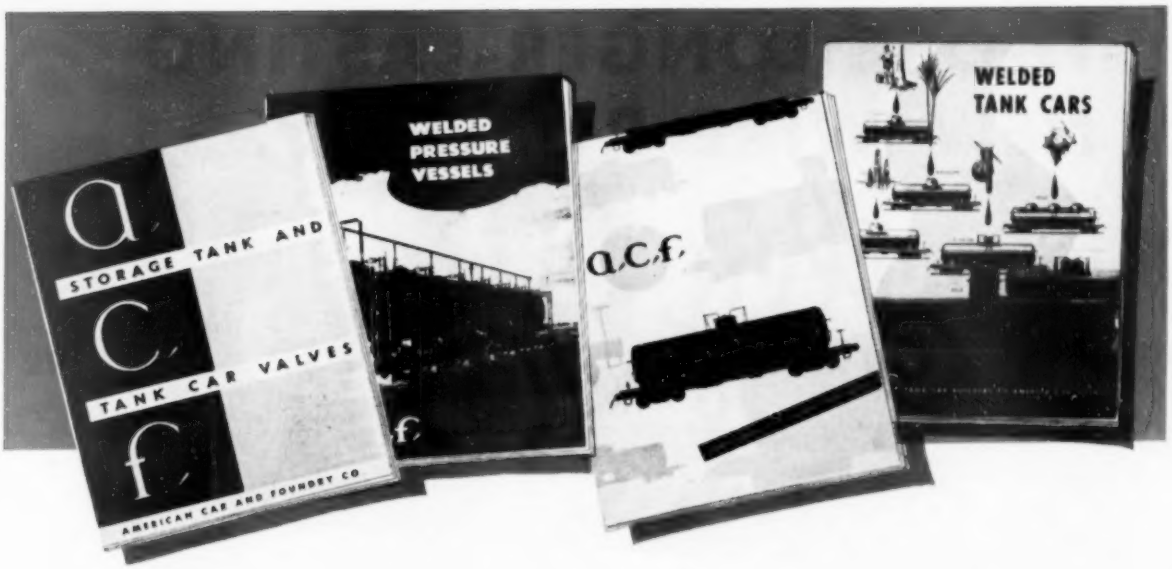
It's just like fishing with a heavy test line when you install E-I-M Valve Controls. You can be sure that the well won't get away from you because E-I-M has a record of safety and dependability. Our engineers can solve your transmission problems with E-I-M Valve Controls for oil or gas lines off shore or across the continent.

The Pure Oil Company's platform in Bolle... miles off the Louisiana coastline, has four prod... wells, each using an E-I-M Valve Control for maxi... mum safety to protect personnel and the platform.

E-I-M Company INCORPORATED

1340 OLD ST. ... TRAIL • HOUSTON 21, TEXAS • MOhawk 4587

Valve Controls • Speed Reducers • Cooling Tower Drives • Control Valves



Four authoritative booklets about:

- **Storage Tank and Tank Car Valves** . . . tells why A.C.F. Valves last longer, flow faster, maintain trouble-free service. Complete specifications of all types available for various ladings and uses.
- **Welded Pressure Vessels** . . . tells the most important factors to consider before purchasing *any* tanks, valves, etc. Gives blueprints and specifications. Tells about manufacturing techniques . . . what they mean to the buyer!
- **Tank Car Classifications for Lading** . . . This is the only reference of its kind! Tells at a glance which tank car to use for any given lading. Also blueprints and latest ICC regulations as they relate to tank usage.
- **Welded Tank Cars** . . . Contains pictures and specifications of standard types for gasoline, liquid caustic soda, sulphuric acid and many other products. Illustrates advanced production techniques . . . blueprints of tank car and valves . . . latest materials for resistance to heat, moisture, etc.

Here, in one convenient place is a wealth of important factual information. Just the facts you'll want most before considering the purchase of *any* of these important products. Send for any or all.

There's an A.C.F. Representative near you to give you further details that are of particular interest. Write: American Car and Foundry Company, New York • Chicago • St. Louis • Cleveland • Philadelphia • Washington • San Francisco

THOSE LONGER-LASTING *NEW* WIRE ROPES....

by J&L STEEL

SPRINGKORE

Ask For Bulletin

This one saves money for ROTARY DRILLERS. The high-carbon cold-drawn steel spring center enables the line to resist crushing, minimizes inside wear, and keeps the line flexible and uniform. The hollow center is lubricant-packed to combat rust and friction.

PLASTIKORE

Ask For Bulletin

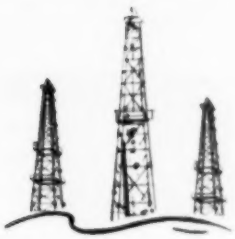
This one saves money for CABLE TOOL DRILLERS. The polyvinyl center is not affected by such things as acids, caustics, moisture, or lack of moisture. It gives firm, uniform support to the steel strands, and it remains flexible. PlastiKore provides the "snap-action" you want in cable tool drilling.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
SUPPLY DIVISION

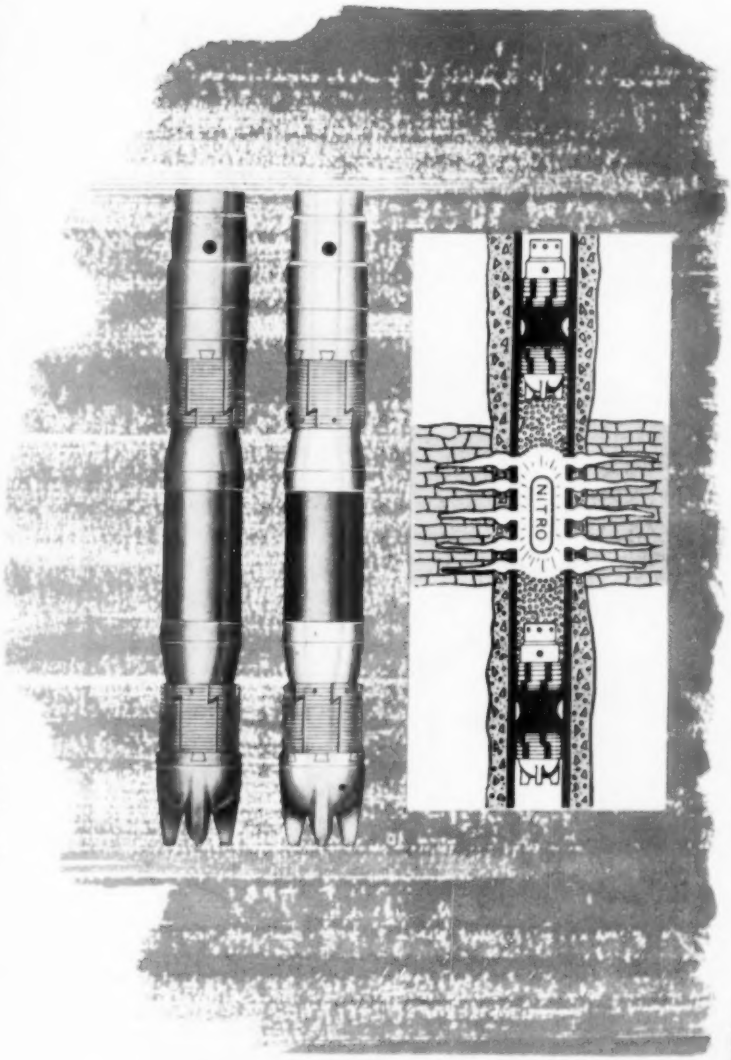
Serving The United States and Canada
General Offices: Tulsa, Oklahoma
J&L Tubular Products and Wire Rope

P·E·S·A
PARTNERS IN PETROLEUM PROGRESS



Our Drillable Wireline Bridging Plugs

do a swell job of keeping nitro shots within bounds



Lane-Wells Drillable Bridging Plugs are effective and economical tamps for nitro-shooting. They can be run and set quickly and economically, and they protect the casing above and below the shot zone. Where a tamp above the nitro is required, a small quantity of sand is placed on top of the charge and a bridging plug set on the sand. A few feet of sand or gravel are dumped on top of the plug and the hole is filled with fluid. Where a section of casing is to be shot out with nitro, it is well to use two bridging plugs and perforate the zone between. The lower plug is run and set 30 feet below the zone, and then covered with gravel to the bottom of the shooting zone. The zone is perforated with a concentration of shots around the top and the bottom to help part the casing. The nitro charge is placed with a time bomb and covered with several feet of sand. The upper bridging plug is then set and covered with a few feet of gravel or cement, and the well is filled with fluid. After the charge has been detonated, the bridging plugs may be quickly drilled out. The upper plug serves to protect the casing from collapse and leaves an easy entrance to the shot hole. The lower plug protects the casing below the shot zone. The 30 feet of gravel can be circulated out leaving 30 feet of casing for the tools to run in the drilling out the lower plug. Variations of those methods have been used successfully in several areas.

Tomorrow's Tools - Today!®

Write for full information on

LANE WELLS COMPANY

BRIDGING PLUGS

LANE-WELLS General Offices, Export Office, Plant • 5610 So. Soto St., Los Angeles 58

LOS ANGELES · HOUSTON · OKLAHOMA CITY · LANE-WELLS CANADIAN CO. IN CANADA · PETRO-TECH SERVICE CO. IN VENEZUELA

AU-703

AVAILABLE JOHNSTON by AL CAPP

IS YO' AVAILABLE JOHNSTON?
YAS'M—AH IS AVAILABLE—BUT STRICTLY FO' TESTIN' OIL WELLS, PRACTIC'LY ANYWHAR!!—AN' BY TH' TIME TH' PIPE IS PULLED!! US JOHNSTONS HAS 73 SERVICE OFFICES!!
DOES YO' WORK FAST?
YAS'M!!—BUT STRICTLY IN MAKIN' TESTS WIF A MINNY-MUM OF LOST DOWN TIME!!
DON'T YO' TEST ANY-THING BUT OIL WELLS?
NOPE!! —THASS OUR SPESHULTY!! —THASS WHY WE USUALLY GITS A SAFE, ACCURATE TEST, TH' FIRST TIME!!
al capp

C-541

Copr. Capp Enterprises, Inc. 1954.

JOHNSTON TESTERS

first in drill stem testing

HOUSTON, TEXAS

LOS ANGELES, CALIF. • CALGARY, CAN.

FORMATION AND CASING TESTING — JOHNSTON

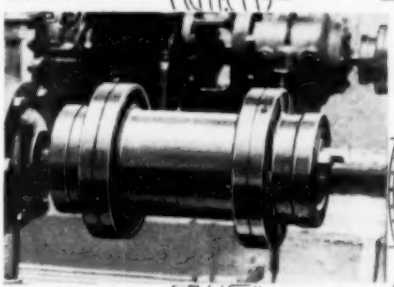
See why
FAST'S Couplings
are your wisest buy

LESS DOWN-TIME. Industry finds that Fast's Couplings, the original gear type coupling, give trouble-free performance. They save on maintenance. Save money (often thousands of dollars in production losses) year in, year out, because there is no down-time due to breakage . . . no expense of replacing perishable parts.

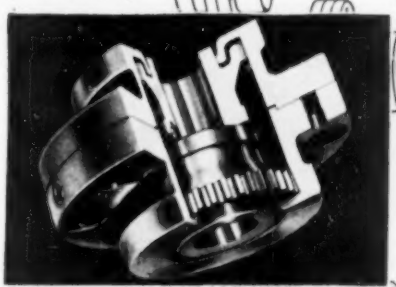
LOWEST COST PER YEAR because Fast's Couplings usually outlast the equipment they connect. Many Fast's Couplings are still in use after 30 years. Why? Because they are ruggedly constructed of the sturdiest, most practical materials . . . all steel in construction, unique in design.

FREE ENGINEERING SERVICE. The same "Know-how" that goes into the manufacture of famous Fast's Couplings . . . that has resulted in over three-fourths of a million successful installations . . . applies to its extensive engineering service. 35 years of experience in developing the most satisfactory materials and designs, means our staff is well prepared to give you the most effective and cost-saving solutions to your coupling problems. Just outline and send them to Koppers for assistance. And send for free catalog. Just mail the coupon below.

Fast's Coupling in a modern petroleum installation.



Close-up of Fast's Coupling . . . ideal in petroleum industry.



Cutaway view of typical Fast's Coupling. Note unique design.

THE ORIGINAL

FAST'S Couplings

KOPPERS

METAL PRODUCTS DIVISION • KOPPERS COMPANY, INC. • BALTIMORE, MD. This Koppers Division also supplies industry with American Hammered Industrial Piston and Sealing Rings, Koppers Electrostatic Precipitators, Aeromaster Fans and Gas Apparatus.

Engineered Products Sold with *Service*

KOPPERS COMPANY, INC., *Fast's Coupling Dept.,* **284 Scott St., Baltimore 3, Md.**

Gentlemen: Send me a Free, Fast's Catalog giving detailed descriptions, engineering drawings, capacity tables and photographs.

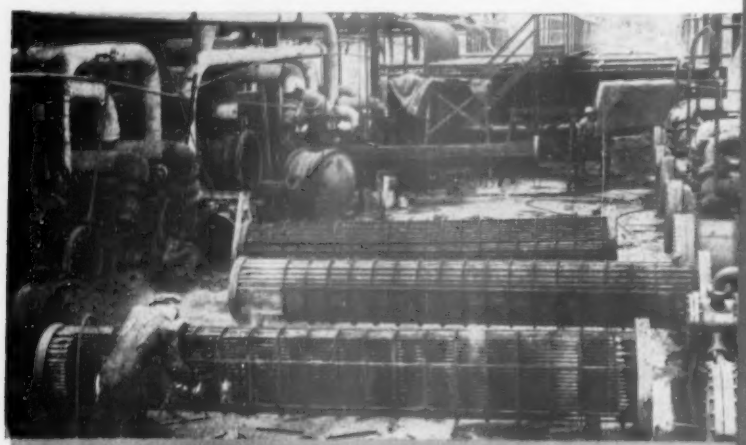
Name .....

Company .....

Address .....

City ..... Zone ..... State .....

CORROSION AND FOULING PROBLEMS?



Over 150 leading refiners are now using Kontol Corrosion Inhibitors to combat corrosion and fouling in their refinery equipment*. Successful Kontol applications have corrected corrosion and fouling problems in lines and equipment of these refinery processes . . . . . .

If you have a corrosion or fouling problem, get in touch with the Tretolite refinery service engineer in your area, or write to

TRETOLITE COMPANY

A DIVISION OF PETROLITE CORPORATION

369 Marshall Avenue, St. Louis 19, Missouri

5515 Telegraph Road, Los Angeles 22, California

DESALTING • DEHYDRATING • WATER DE-OILING • CORROSION INHIBITORS • SCALE PREVENTIVES • ASPHALT ADDITIVES

KONTOL PROVIDES PROVED ANSWERS

Crude Stills

Depropanizers

Debutanizers

Depentanizers

Gas Plant Absorbers

Cat Cracker Fractionators

Stabilizers

Platformers

Reformers

Vacuum Towers

Desulfurization Systems

Gas Recovery Systems

Coking Systems

Alkylation Plants

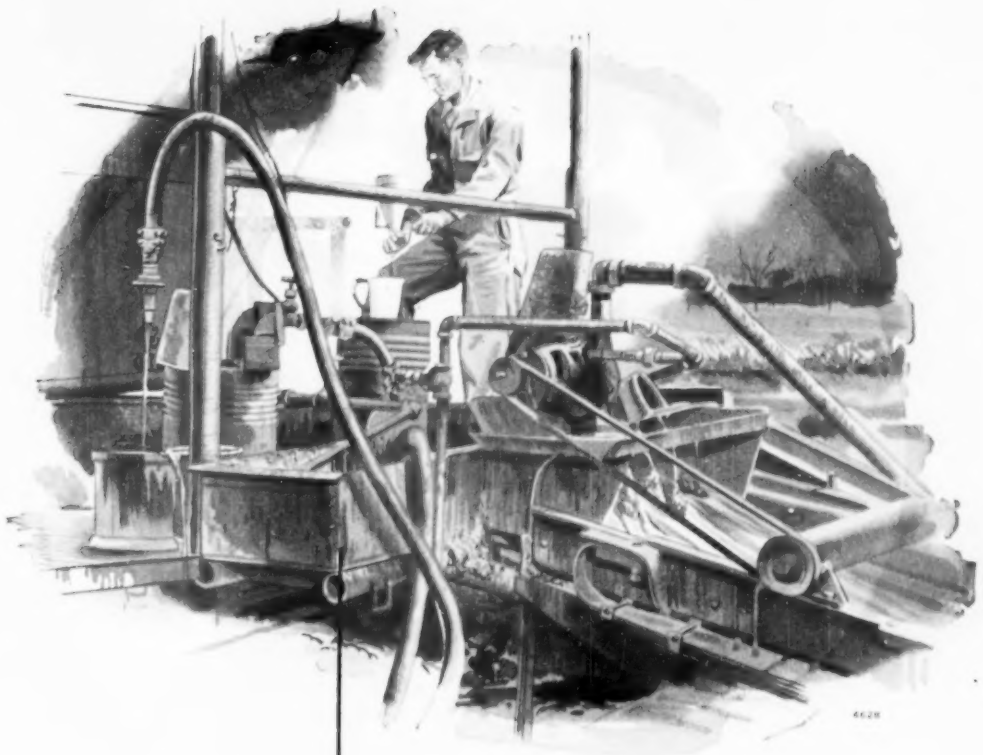
Alkanolamine Sweeteners

Dewaxing Systems

*

While Kontol is best known for the protection afforded to carbon steels, it is also effective with alloys such as admiralty metal, cupra-nickel, stainless and others.

KR 54-13



Anticipated mud problems

...are more easily controlled

Baroid products available at over 600 distribution points, throughout every active drilling area.

The most effective mud programs consider the formations to be drilled from spudding to completion, the equipment to be used, the amount of money to be spent, and the results that are to be achieved.

More than a quarter-century of Baroid research and experience provides your Baroid field man with the necessary information to help you plan your mud program . . . *before the well is spudded in* . . . and to solve mud problems while drilling. Baroid's complete line of field proved mud products, developed during years of drilling progress, are always available, everywhere, and are being continually improved to solve new problems.

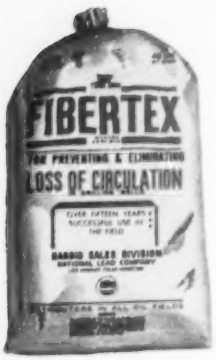
Baroid field service engineers are available to assist you in your mud program planning. Use their services regularly for mud control that provides faster, safer, more economical drilling.

Baroid engineers have compiled a series of trouble shooting charts to help you solve your drilling mud problems. The charts can not prescribe a trouble-free mud for all conditions. They DO provide suggestions on specific mud problems encountered during the various phases of drilling your well. Write for your copy now.

..NOW AS EVER

you can rely on **Baroid**

Baroid Sales Division • National Lead Company • Main Office: P. O. Box 1675, Houston 1, Texas



Why Baroid's FIBERTEX more efficiently prevents mud loss in porous formations

BECAUSE . . . Fibertex is a scientifically developed intimate mixture of long and short sugar cane fibers it more efficiently forms a mat-like bridge in and over formation openings that take mud. Subsequent rapid deposition of a filter cake takes place, completely sealing many formations to which mud is lost.

Fibertex is mixed with the drilling mud either in concentrated batches, for spot treatment, or throughout the entire system. Fibertex is carried to the formation in the mud, which furnishes the colloidal particles needed to form the final filter cake seal.

Fibertex has continued to surpass all other fibrous materials for preventing or overcoming lost circulation. Special processing enables it to resist decomposition even after remaining in the mud system for long periods. The first and still the best scientifically developed lost circulation material, be sure to ask for Fibertex.

Fibertex is available in handy 40-pound bags at your favorite Baroid distributor. Over 600 distribution points throughout the active oil area to serve you.

..NOW AS EVER

you can rely on

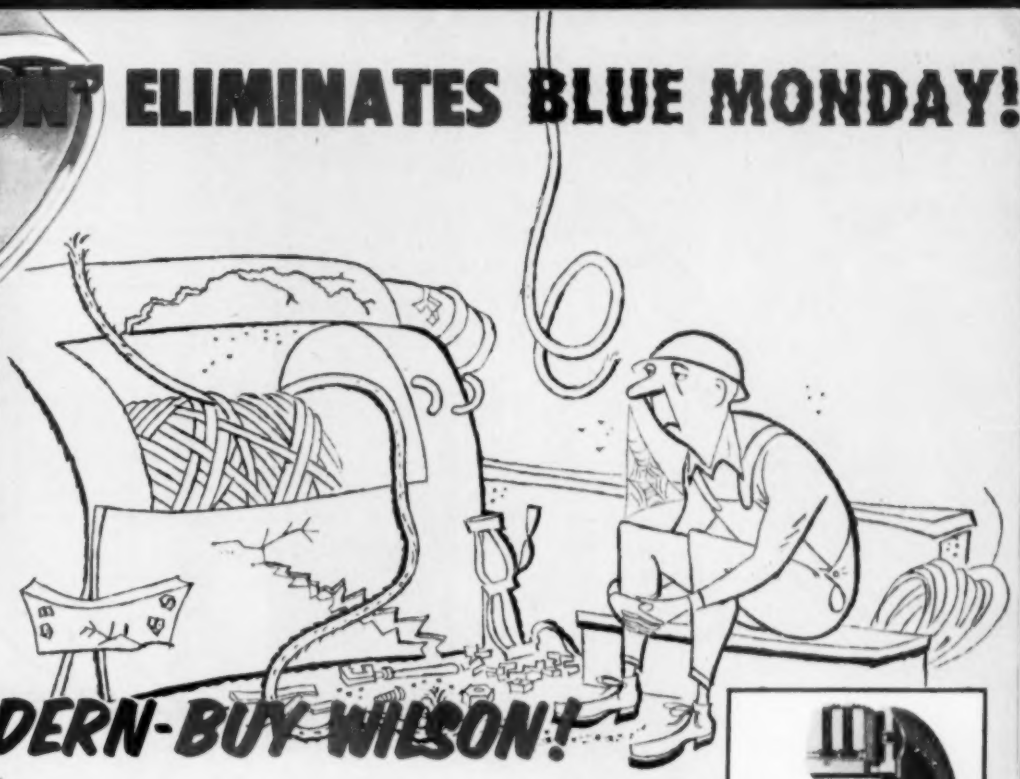
BAROID · AQUAGEL · QUIK-GEL · DRILLING MUD · BAROID

Baroid

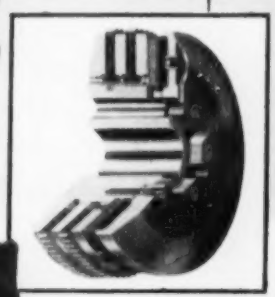
BAROID SALES DIVISION • NATIONAL LEAD COMPANY

Main Office: P. O. Box 1675, Houston 1, Texas

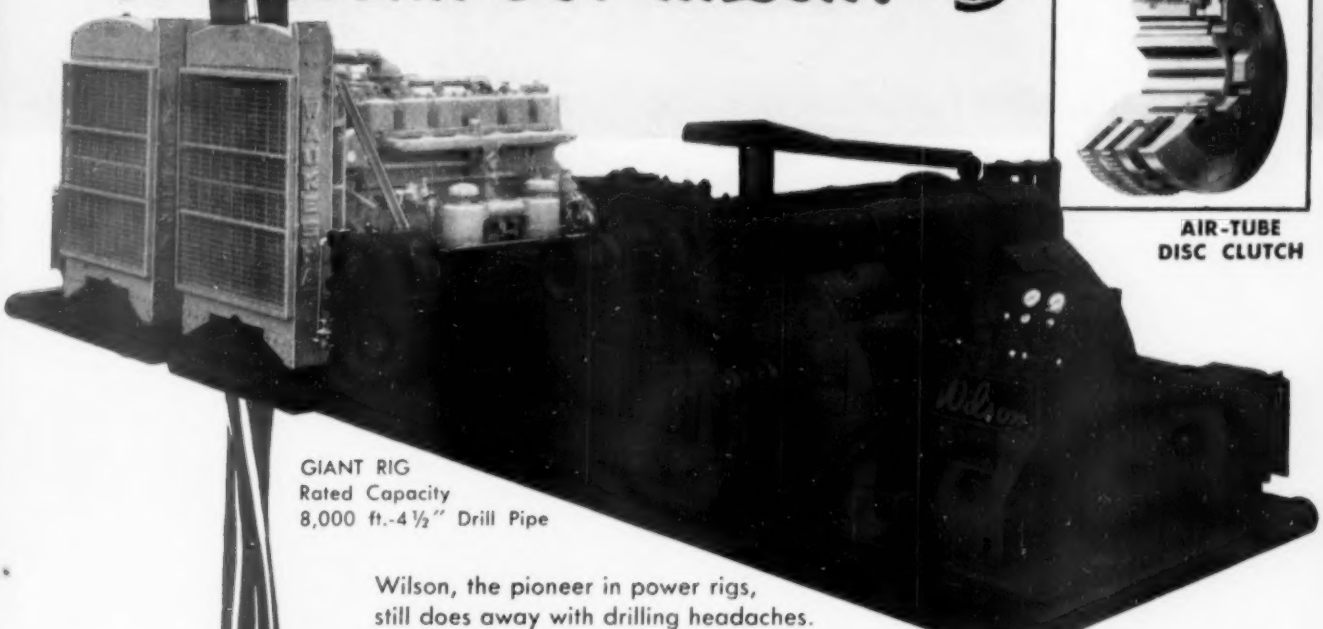
"RED IRON" ELIMINATES BLUE MONDAY!



BE MODERN-BUY WILSON!



AIR-TUBE
DISC CLUTCH



GIANT RIG
Rated Capacity
8,000 ft.-4½" Drill Pipe

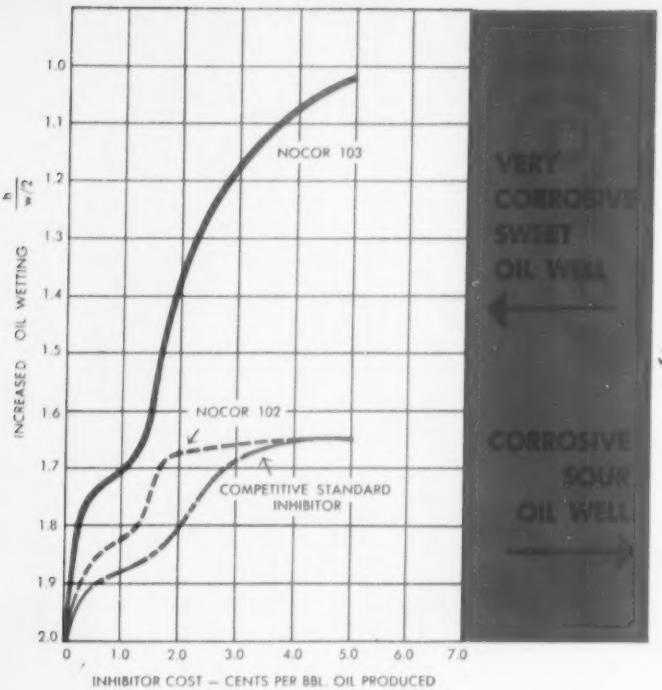
Wilson, the pioneer in power rigs,
still does away with drilling headaches.
Why buy an obsolete rig? Only Wilson has the
all-friction clutch compound and transmission drive. Get up-to-date,
and do away with the trouble of trying to maintain several types of clutches
on one rig. Wilson built the first chain-drive transmission, with
jaw clutches. Then Wilson built the first and *only* chain-drive transmission
and compound with all-friction clutches. Use the finest clutch built,
the Air-Tube Clutch. Be modern, buy Wilson, and forget BLUE MONDAY.

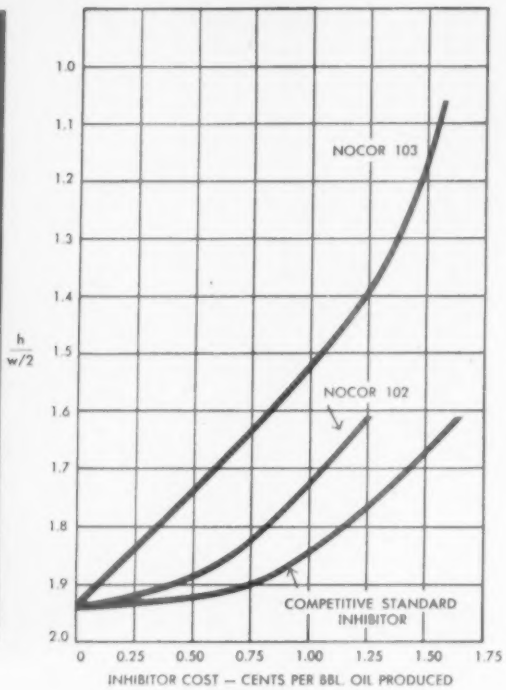
Wilson

The FIRST NAME in DRILLING RIGS!

WILSON MANUFACTURING CO., INC.

The HOME of RED Iron • WICHITA FALLS, TEXAS, U.S.A.





Corrosion research develops potent new inhibitor—

Nocor "103"

In a series of articles published by the Oil and Gas Journal early in 1953, it was shown that the two properties oil and gas well inhibitors should possess are (1) the ability to form a tenacious film on the surface to be protected and (2) to render that surface oil-wet. Both characteristics should be as great as the researcher can possibly make them.

For some time, corrosion technicians have known that certain known compounds possess the ability to form a tight film on a steel surface—providing they have access to that surface. Other molecules possess the property of rendering steel surfaces oil-wet in systems which contain both oil and brine. Unfortunately, no single compound was known which possessed both properties to a high degree. It was necessary to blend both film-forming and oil-wetting molecules into commercial inhibitors in order that the product would possess the desired properties to a satisfactory degree. It is evident that a single molecular species capable of performing both functions would possess advantages both in ability to reduce corrosion and in the economy of the finished product.

Cardinal Chemical began working toward a single molecular structure which possessed all the desired properties. Within seven months, Cardinal synthesized test tube quantities of a compound which showed unusual promise. Four months later, Cardinal developed a means of producing the new molecule in commercial quantities. Nocor "103" was born.

In certain dynamic weight-loss tests, Nocor "103" gives good protection at 25 p.p.m., while Nocor "102" (long since proven in the field to be a superior product) shows no inhibition at 50 p.p.m., and is mediocre at 75 p.p.m.

RENDERS STEEL OIL WET

The most unusual performance of Nocor "103", however, lies in its ability to render surfaces oil-wet. This is in keeping with a prediction in the articles mentioned above that the most significant new improvement in corrosion inhibitors would result from enhanced wetting properties. Figures 1 and 2 emphasize the exceptional performance of the new product. The measurements were made upon air-free samples of crude oil and brine from unusually corrosive wells. Oil-wetting ability is expressed by the Drop Shape Ratio method (see J. Phys. Chem., 40, 159, [1936] for a discussion of the method). There are several reasons why this method may not correlate with dynamic field conditions, but one thing is certain: field conditions, if different from laboratory conditions, will have an adverse effect upon oil-wetting. Therefore, a product which cannot pass this test will be expected to exhibit poor wetting in the field. Fortunately, a great amount of work has been done with the Drop Shape Ratio. It is proved that—especially in sweet oil wells—use of sufficient concentrations of wetting agents to reduce a drop shape ratio to a value of 1.7 or below will control corrosion. This holds true even if the wetting agent possesses no ability whatever to form a lingering tenacious film (Corrosion, 10, No. 3, 106-109, [March, 1954]).

FIGURES SHOW NEW NOCOR SUPERIOR

Data in Figure 1 were measured on fluids from a problem well treated unsuccessfully with both Nocor "102" and a standard oil well inhibitor. The failure of these inhibitors possibly may lie in their inability to render the steel surfaces oil-wet when small amounts are used. Nocor "103" can afford a high degree of protection in this well by virtue of its oil-wetting properties alone. In addition, it simultaneously forms a protective film which further multiplies the effectiveness several times over again.

Limited field tests to date show that Nocor "103" used in the same concentrations as Nocor "102" will reduce residual corrosion rates to as little as 1/10 that permitted by Nocor "102".

OTHER ADVANTAGES

Other properties of Nocor "103": its pleasant odor, non-toxicity, fluidity in cold weather, sufficient dispersability in brine to permit complete flushing to bottom in high water: oil ratio wells.

Price $1.50 per gallon, f.o.b., Odessa, Texas.

If corrosion is a problem in the production of your oil wells, switch to the new Nocor "103"—another product of Cardinal's unending research to make good things better.

New literature reporting fully on the new Nocor "103" is being made ready now for the presses, and will be available soon.

CARDINAL CHEMICAL

INCORPORATED

HOME OFFICE

P. O. Box 2049, Odessa, Texas

Advertisement

They Say—

Higher Octanes Economical

"Manufacturers state that such (high-compression) engines can be produced without major changes, and the petroleum industry will have adequate quantities of higher octane gasoline within 3 to 4 years.

"While this fuel will be higher in price, the cost per mile will be actually less.

"The mileage obtained in a 10 to 1 engine using required octane gasoline is 17.3 miles per gal. in contrast to 10 miles per gal. in a 7.2 to 1 engine using 87 octane fuel."

Dr. Gustav Egloff, director of research for Universal Oil Products Co., in address before the Charleston, W. Va., Open Forum.

Oil Tax Tinkering Dangerous

"Aside from the political aspects of the situation, Congress must bear in mind the urgent necessity for continued exploration for oil by the domestic industry. Any tax blow which would discourage domestic production would in the natural progress of events throw the nation even deeper into the dangerous foreign oil snarl which at any time could develop into military complications.

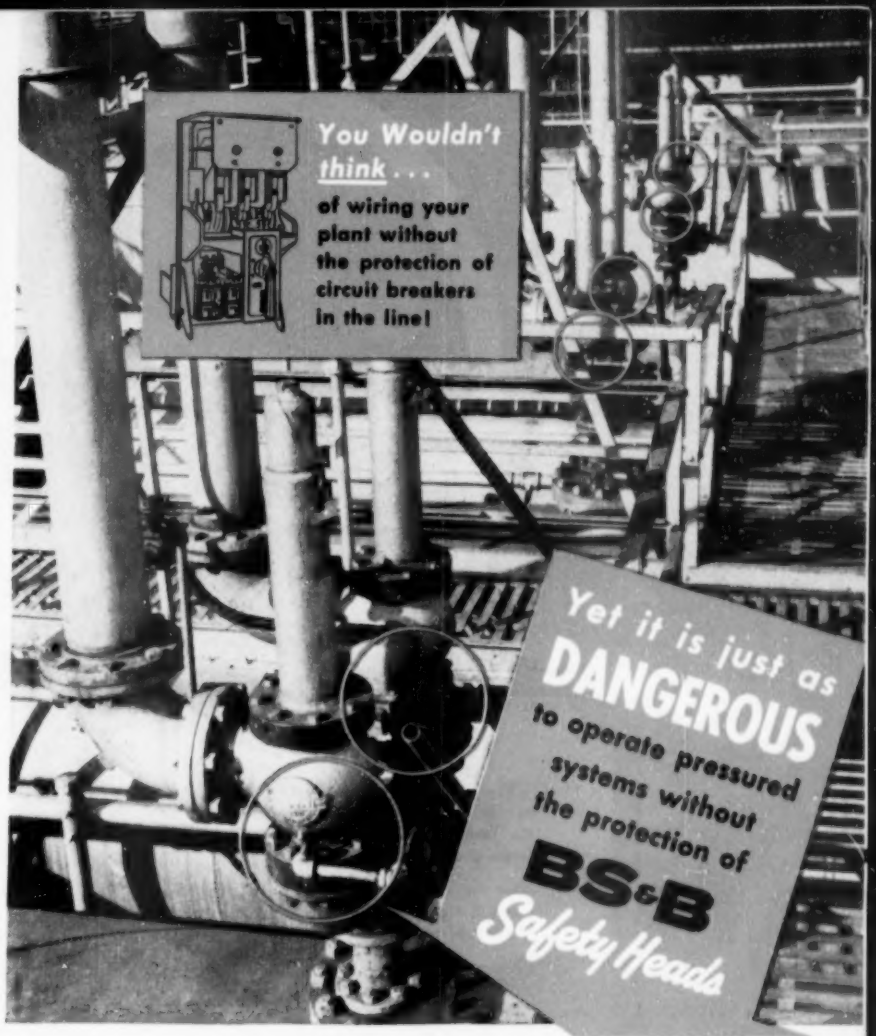
"From any viewpoint, the oil industry is complicated. It is sensitive in the extreme to economic fluctuations. And, certainly, anything that would do harm to the domestic arm of the industry would do harm to the entire industry. It is trite but true that as the oil industry flourishes so, too, does the general economy benefit."

Editorial in the Tulsa, Okla., World.

O.W.I.U. Only Gainer in Merger

"What would be gained by changing the system now? Independent unions would lose their autonomy—and also their chance to negotiate a better deal than the national average. By working independently, many locals have obtained more benefits than the national unions have.

"The only gainer, so far as we can see, would be the Oil Workers International Union (CIO). By far the largest and best organized of the 70 or more unions in the industry, the O.W.I.U. could hope to dominate the amalgamation and, sooner or later, absorb all oil workers into its dues-paying ranks. The chief motivation and result of the


You Wouldn't think . . .
of wiring your plant without the protection of circuit breakers in the line!
Yet it is just as DANGEROUS to operate pressured systems without the protection of
BS&B
Safety Heads

Just as an electrical circuit breaker protects your personnel, plant and equipment from electrical overloads, shorts and "burn-outs", so does the BS&B Safety Head protect them from the dangers of overpressure in pressured systems.

The BS&B Safety Head is a patented pressure relief device that is designed to become an integral part of any pressured system containing air, gas or liquid—either bland or corrosive.

The rupture disc of the BS&B Safety Head is custom fabricated to the specific requirements of the system of which it is a part. It provides a full pipe-sized vent for *instantaneous* relief before the pressure exceeds the safety limits of the system.

The BS&B Safety Head is especially suited to use in oil and gas producing fields, pipe lines, refineries, chemical plants, power plants and the refrigeration industry. It may be used as either a primary or secondary relief device, and either upstream or downstream from a relief valve, as varying conditions may require.

If you aren't already using BS&B Safety Heads in *your* plant, we'd suggest you get in touch with your nearest BS&B representative without delay. Or write for complete BS&B Safety Head Catalog. There's no obligation.

BS&B
Safety Heads

THE "CIRCUIT-BREAKER" OF
Any Pressured System

BLACK, SIVALLS & BRYSON, INC.
Safety Head Division, Dept. 2-A4
7500 East 12th St., Kansas City 26, Mo.

SAFETY BS&B HEADS OVER 60 YEARS

OUR

1881 1944

JOHN J. LARKIN, Founder

In December, 1904, John Larkin left his father's business in Butler, Pa., and went to what is now the State of Oklahoma. After investigating the possibilities of that new frontier he started his business in Bartlesville — April, 1905.

After the usual ups and downs, his business grew and in 1920 he found it expedient to move the Company to a new and larger plant in St. Louis where it is still located.

He had a tremendous capacity for hard work and for being—The Boss.

50th YEAR

As we enter our fiftieth year we pause a while for a meditative look back.

Things have changed a bit since The Boss went to Indian Territory and set up shop in the heart of the Osage Nation.

We do not now claim any particular distinction for having been around for fifty years. Our real source of pride comes from the friendships which have been formed along the way. Without those friendships, whatever success is ours would not have been possible.

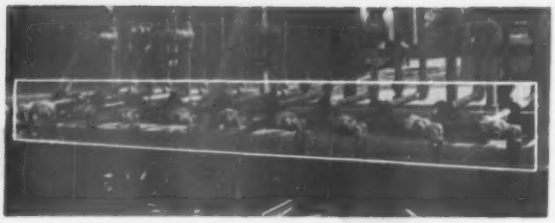
With sincere appreciation, with a firm resolve to perpetuate your confidence, with keen anticipation of our association in the future, we turn to the road ahead.

LARKIN

...Through Your Supply Store

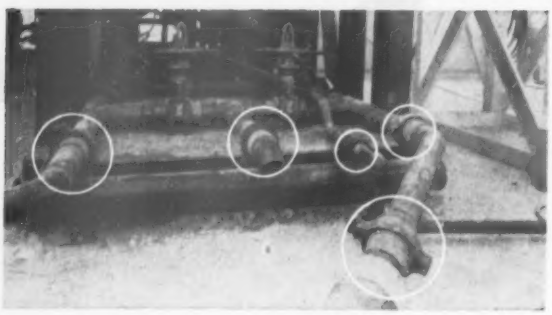
LARKIN PACKER CO., INC.
ST. LOUIS, MO.

This efficient blowout preventer control manifold uses 1" WECO Fig. 602 Unions and Chiksan 1" style 50 High Pressure Swivel Joints.



WECO UNIONS

PAY OFF in Service and Dependability



WECO Fig. 602 Unions on the rig's mud line.

WECO Unions pay their way many times over in longer life, trouble-free service and leak-proof sealing. The time and work saved in rigging-up and tearing-down mean more savings for you.

The WECO Fig. 602 Union is an outstanding example. Strong, tough and compact, it withstands the severe conditions and high pressures of present day deep drilling. Its steel-to-steel Ball and Cone Seat is protected by a replaceable, resilient seal ring.

These photos show some of the WECO Fig. 602 Unions used exclusively on a 10,000-ft. rig recently shipped to a foreign country.

PESA

it's wise to standardize with... WECO

WECO

WELL EQUIPMENT MFG. CORP. • Division of Chiksan Company • HOUSTON 1, TEXAS

merger attempt would seem to be the aggrandizement of this one group."

Editorial in the Oil City, Pa., Derrick.

Iranian Settlement Urgent

"The new turmoil erupting in various parts of the Middle East lends added urgency to the efforts now under way in London to settle the Iranian oil dispute as the best way of stabilizing a key country in that region. The situation is hopeful, because there is no longer any dispute in principle.

"But the situation is also urgent because the Zahedi Government lives for the moment on the American emergency grant of $45,000,000, and this grant will be exhausted by the end of April.

"In this situation it seems regrettable that a settlement is being held up by British insistence on control of the international consortium which is to provide the foreign management for the oil properties. But the British themselves will admit the main cause of Mossadegh's emergence, and the main obstacle to a settlement, has been popular resentment in Iran against the Anglo-Iranian Oil Co., for which that company is not wholly without blame, and that a supposedly international consortium under its thinly disguised control would meet the same objections.

"If this should jeopardize the settlement, and therewith Iran itself, the British Government would saddle itself with responsibility for consequences out of all proportion to the 4 per cent difference (controlling interest) involved."

Editorial in the New York Times.

Gas Turbine Development

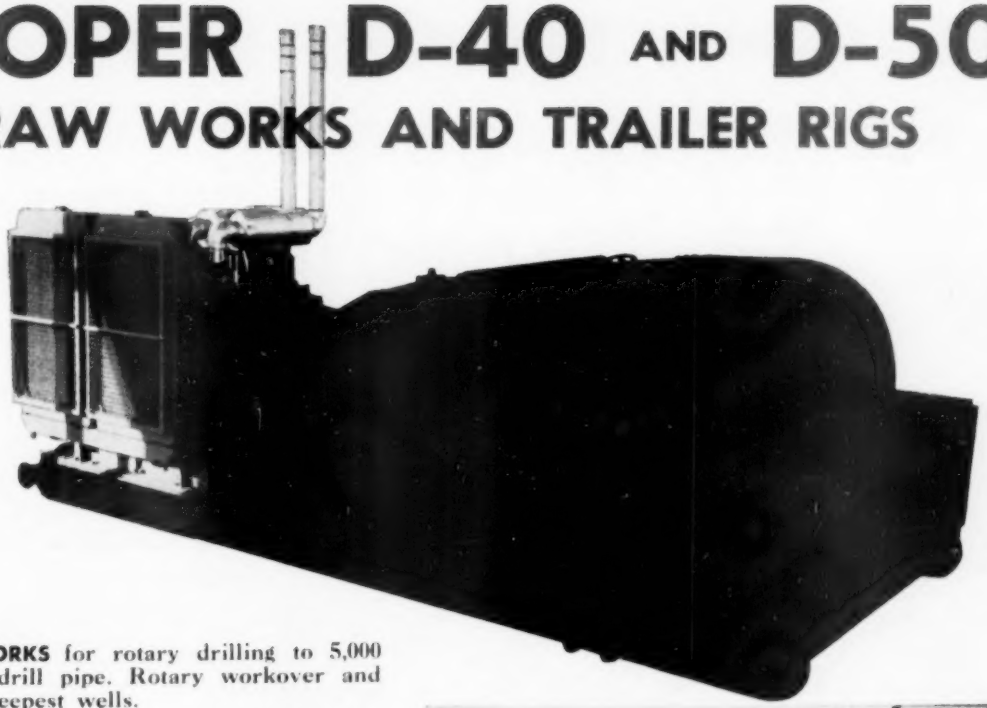
"Since the gas turbine would only be competitive with a piston engine in applications where the engine is operating at full load the majority of the time, it would seem that the first commercial service of this engine would be in the bus and truck field.

"Many basic advantages certainly justify thorough investigation and development. However, the gas turbine must give better performance than the reciprocating engine and its efficiency must be improved to be acceptable.

"To succeed, the gas turbine must meet the performance and efficiency not only of present-day engines, but of engines of the future. Continuous refinement and development of piston engines and steam power plants will serve to keep competition keen."

Max M. Roensch, director of laboratory tests, Chevrolet Engineering Department, Detroit, in paper before the lubrication committee of the American Petroleum Institute.

COOPER D-40 AND D-50
DRAW WORKS AND TRAILER RIGS



D-50 DRAW WORKS for rotary drilling to 5,000 ft. with 4½" drill pipe. Rotary workover and servicing the deepest wells.

Brakes: 52" dia. x 10" face to handle the heaviest loads safely.

Powered by diesel or gas engine up to 400 horsepower.

D-40 DRAW WORKS for rotary drilling to 4,500 ft. with 4½" drill pipe. Servicing and rotary workover to 10,000 feet.

Brakes: 42" dia. x 8" face.

Powered by diesel or gas engine up to 300 horsepower.

These modern rigs are similar in design.

Both have—

Torque Converter drives,

Oil Bath multiple strand roller chain drive to countershaft,

Torqmatic three-speed and reverse transmission that can be shifted under full load and at full speed, instantly, without slowing, declutching or in any way losing time in shifting gears.

Air Friction Clutches in drums. Single drum or double drum models.

These units mounted as trailer rigs with heavy, two pole, telescoping masts are exceptionally fast to move and set up on the job. Tubing boards and rod hangers automatically go into place when mast is telescoped.

Cooper D-50 trailer rig with 91 ft. extra heavy two pole telescoping mast, tubing board and rod hangers on a 10,000 foot well.

Cooper builds rugged machinery for the toughest jobs.

FRED E. Cooper, Inc.

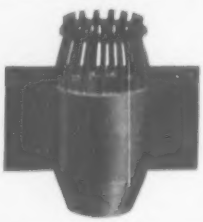
P. O. BOX 1890 TULSA, OKLA.

Houston, Odessa, Los Angeles

4 types of GUIBERSON SWAB CUPS

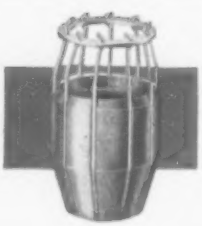
TYPE "J" cup lifts heaviest loads from wells of any depth. In the *yellow* box!

TYPE "L" Cup performs superbly on medium and light fluid loads in wells of any depth. Buy the pair in the *blue* box!



TYPE "GW" Cup is a special purpose cup that's tops for running in rough tubing —getting the last cupful of fluid in shallow wells. In the *green* box!

TYPE "K" Tubing Swab cup is a low-priced general purpose swab cup for depths up to 6000 feet. In the *red* box!



LIFT ANY LOAD FROM ANY DEPTH

and do it in record time!

Fast-falling Guiberson Tubing Swabs, with compact, one-piece mandrel and any of *four* types of Guiberson Tubing Swab Cups... give unexcelled performance in lifting *any* load from *any* depth.

All Guiberson cups have flexible lips that insure good wall contact in lifting the load... pass collar gaps smoothly without loss of fluid.

For deep wells, shallow wells, or medium wells... for heavy, medium or light loads... for smooth or rough tubing— Guiberson offers the widest range of cup types and sizes on the market today!

WHATEVER YOUR SWABBING PROBLEM

there's a Guiberson Cup that answers it!

Better Be Safe Than Sorry!

THE
GUIBERSON
CORPORATION
ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.
Sold By Leading Oil Field Supply Stores Everywhere

CALENDAR

APRIL

13-15 Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, Okla.

14-16 National Petroleum Association, fifty-first semiannual meeting, Cleveland Hotel, Cleveland.

15-16 Sixth National Personnel Conference of the Gas Industry, American Gas Association and Southern Gas Association, Edgewater Beach Hotel, Chicago.

19-21 National Purchasing and Stores Conference, sponsored by the American Gas Association, Atlanta, Ga.

20-23 Distribution, Motor Vehicles and Corrosion Conference, Operating Section, American Gas Association, Mount Royal Hotel, Montreal.

21-23 1954 Southern Industrial Wastes Conference, Manufacturing Chemists Association Southern Association of Science and Industry, and the Texas Chemical Council, Houston.

21-23 Natural Gasoline Association of America, thirty-third annual convention, Baker Hotel, Dallas.

22 Illinois Oil and Gas Association, annual membership meeting, Hotel Emmerson, Mount Vernon, Ill.

22-23 West Texas short course on oil-lifting methods, Texas Technological College, Lubbock.

24 Fourth John Zink Process Heating Seminar, John Zink Burner Co. plant, 4401 S. Peoria, Tulsa.

26-28 Southern Gas Association, annual convention, Houston.

27 Distillation in Practice, second of an Experience in Industry series, Philadelphia - Wilmington section of the American Institute of Chemical Engineers and University of Pennsylvania, University Museum, Philadelphia.

MAY

2- 4 Independent Petroleum Association of America, midyear meeting, Cosmopolitan Hotel, Denver.

3- 5 American Geophysical Union, thirty-fifth annual meeting, National Academy of Sciences, Washington, D. C.

3- 5 Air Pollution Control Association, annual meeting, Patten Hotel, Chattanooga, Tenn.

4-7 American Welding Society, national spring meeting, Hotel Statler, Buffalo, N. Y.

6- 7 American Petroleum Institute, Division of Production, Pacific Coast district meeting, Statler Hotel, Los Angeles.

9-12 Liquefied Petroleum Gas Association, annual convention and trade show, Conrad Hilton Hotel, Chicago.

10-12 Ninth annual Purdue Industrial Waste conference, Purdue Memorial Union, Lafayette, Ind.

10-12 American Petroleum Institute, Division of Transportation, Products Pipe Line Conference, Warwick Hotel, Philadelphia.

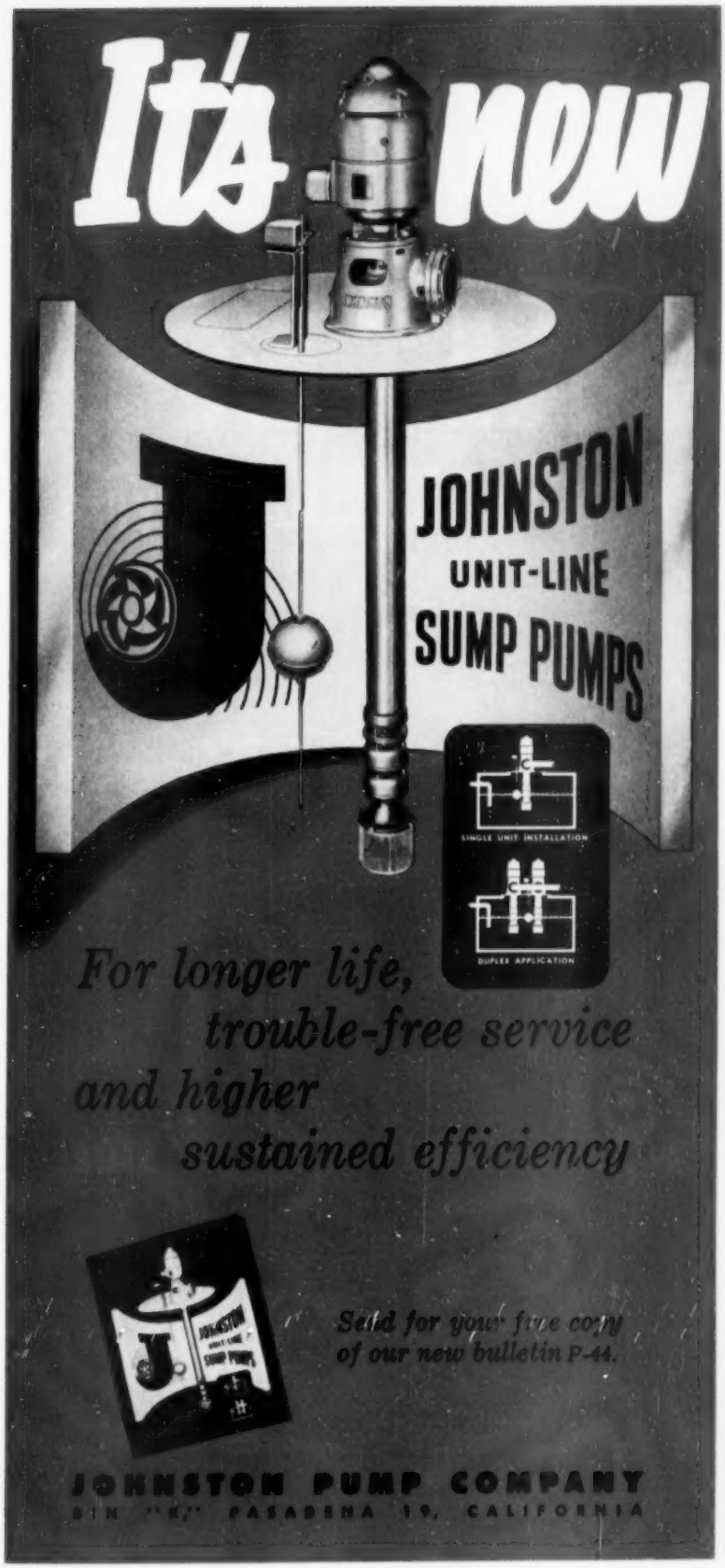
10-13 American Petroleum Institute, Division of Refining, midyear meeting, Rice Hotel, Houston.

12-13 Pacific Coast Gas Association, gas supply and transmission conference, Mark Hopkins Hotel, San Francisco.

14-15 Interstate Oil Compact Commission, General Oglethorpe Hotel, Savannah, Ga.

16-19 American Institute of Chemical Engineers, Springfield, Mass.

17-19 American Petroleum Institute, Division of Marketing, midyear meeting, Cosmopolitan Hotel, Denver.



When you think of
PUMPING UNITS
Think of
ALTEN
including IDECO types

ALL API SIZES

BOTH AT YOUR LOCAL SUPPLY STORE

BOTH MANUFACTURED BY

ALTEN
Foundry & Machine Works, Inc.
LANCASTER, OHIO

SALES OFFICES
Lancaster, Ohio
Olney, Illinois
Hutchinson, Kansas
Duncan, Okla.
Tulsa, Okla.
Wichita Falls, Texas
Houston, Texas
Midland, Texas
Casper, Wyoming
Edmonton, Alberta, Canada

EXPORT OFFICE
New York City

WAREHOUSES
Lancaster, Ohio
Wichita Falls, Texas
Houston, Texas
Odessa, Texas
Casper, Wyoming
Edmonton, Alberta, Canada

20-21 Kentucky Oil and Gas Association annual meeting, Lafayette Hotel, Lexington, Ky.
24-26 American Gas Association, production and chemical conference, William Penn Hotel, Pittsburgh.
27-28 Natural Gas and Petroleum Association of Canada, Prince Albert Hotel, Windsor, Ont., Canada.
31-June 5 American Petroleum Institute, Division of Production, midyear committee conference, St. Francis Hotel, San Francisco.

JUNE

2-4 Southern Gas Association, short course in gas technology, Texas College of Arts and Industries, Kingsville, Tex.
3-4 Pennsylvania Grade Crude Oil Association, thirty-first annual meeting, Hotel William Penn, Pittsburgh.
6-11 Society of Automotive Engineers, summer meeting, Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J.
13-18 American Society for Testing Materials, annual meeting and exhibit, Sherman and Morrison Hotels, Chicago.
17-19 American Petroleum Institute, Division of Production, eastern district meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.
17-19 National Oil Scouts and Landmen's Association, annual meeting, New Orleans.
20-24 Canadian Gas Association, Banff Springs Hotel, Banff, Alta., Canada.
JUNE 20-JULY 4 Seventh annual Conferences on Personnel Administration and Managerial Development, Industrial Relations Section of the California Institute of Technology, California Institute of Technology, Pasadena, Calif.
24-25 Western Petroleum Refiners Association, regional meeting, Leonard refineries auditorium, Alma, Mich.
25-26 Southern Gas Association, transmission management conference, Hotel Adolphus, Dallas.
27-July 1 Petroleum Equipment Suppliers Association, nineteenth annual meeting, Manoir Richelieu, Murray Bay, Que., Canada.

JULY

23 Southern Gas Association, communications conference, Rice Hotel, Houston.
24 Southern Gas Association, dispatchers' conference, Rice Hotel, Houston.

AUGUST

16-18 Society of Automotive Engineers, West Coast annual meeting, Statler Hotel, Los Angeles.
20 Southern Gas Association, natural-gas processing conference, Herring Hotel, Amarillo, Tex.
21 Southern Gas Association, pipe-line operations conference, Herring Hotel, Amarillo, Tex.
26-28 (tentative) Intermountain Association of Petroleum Geologists, fifth annual field conference, beginning at Price, Utah.

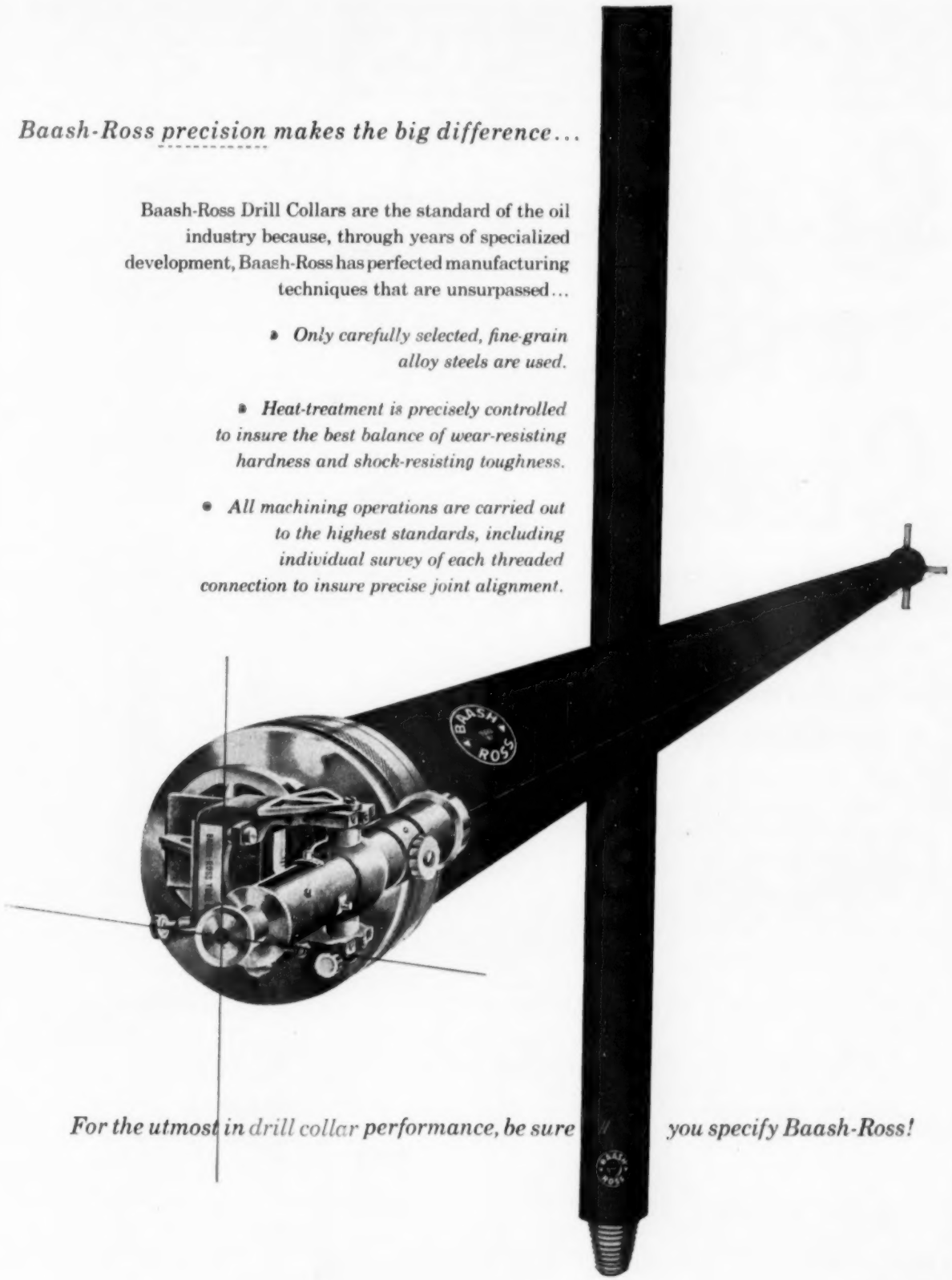
SEPTEMBER

7-9 Association of Desk and Derrick Clubs of North America, annual convention, Banff Springs Hotel, Banff, Alta.
8-10 Pacific Coast Gas Association, sixty-first annual meeting, Vancouver Hotel, Vancouver, B. C.

Baash-Ross precision makes the big difference...

Baash-Ross Drill Collars are the standard of the oil industry because, through years of specialized development, Baash-Ross has perfected manufacturing techniques that are unsurpassed...

- *Only carefully selected, fine-grain alloy steels are used.*
- *Heat-treatment is precisely controlled to insure the best balance of wear-resisting hardness and shock-resisting toughness.*
- *All machining operations are carried out to the highest standards, including individual survey of each threaded connection to insure precise joint alignment.*



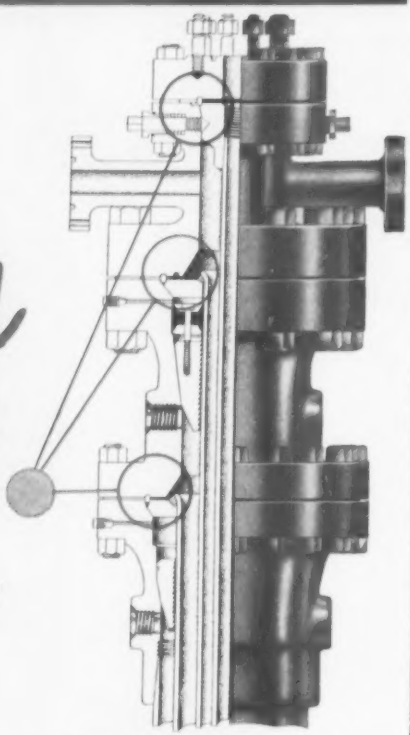
For the utmost in drill collar performance, be sure you specify Baash-Ross!

BAASH-ROSS TOOL COMPANY *Los Angeles, Houston, Oklahoma City, Odessa, Casper, Canton, New York*

RECTORHEADS

Seal with Steel all the way

- for Safety
- for Permanence
- for Simplicity



Assembly of Type "RH" Rectorhead Casing Heads with three Casing Strings and Type "M" Tubing Head. Notice how welding ring seats in head body. API Ring Gasket completes the "seal-with-steel."

You wouldn't think of using soft packings between flanges or flanged fittings, particularly where temperatures and pressures are high. Then why use them in casing or tubing heads, where conditions are even more severe, and leaks more disastrous.

When you use Rectorheads you "seal-with-steel." The welded seals, plus API Ring Gasket, never require replacement or maintenance, will not "flow" under high pressure or temperature, will not "freeze" or contract under low temperature, will not burn out or deteriorate. The Rector Welding Procedure is covered in API Std. 6E., Third Edition, January 1952.

Why risk soft seals in your well heads when you don't use them in flanges? Specify Rectorheads and you can "seal-with-steel" between casing strings.

Sold through authorized Supply Stores.

RECTOR WELL EQUIPMENT COMPANY INC

MAKING THE OIL INDUSTRY SAFER

1100 NORTH COMMERCE ST. FORT WORTH, TEXAS

Houston Plant: 2215 Commerce St.

REPRESENTATIVES IN ALL ACTIVE FIELDS

RECTORHEAD RECTORSEAL

9-11	Interstate Oil Compact Commission, Omaha, Neb.
12-16	American Institute of Chemical Engineers, Colorado Hotel, Glenwood Springs, Colo.
13-14	Independent Natural Gas Association of America, annual meeting, Roosevelt Hotel, New Orleans.
15-17	National Petroleum Association, fifty-second annual meeting, Traymore Hotel, Atlantic City, N. J.
16-17	Mid-Continent Oil and Gas Association, Louisiana-Arkansas division, annual meeting, Roosevelt Hotel, New Orleans.
23-24	Western Petroleum Refiners Association, regional meeting, Henning Hotel, Casper, Wyo.
25	Southern Gas Association, compressor-station conference, Captain Shreve Hotel, Shreveport, La.
27-29	Electrical Conference for Petroleum Industry, American Institute of Electrical Engineers, Mayo Hotel, Tulsa
27-30	Ninth Annual Petroleum Mechanical Engineering Conference, petroleum division of the American Society of Mechanical Engineers, Statler Hotel, Los Angeles.

OCTOBER

2	Southern Gas Association, right-of-way conference, Peabody Hotel, Memphis, Tenn.
4-6	Texas Mid-Continent Oil and Gas Association, annual meeting, Plaza Hotel, San Antonio, Tex.
4-6	Petroleum Electric Power Association, twenty-sixth anniversary meeting, Jung Hotel, New Orleans.
7- 8	California Natural Gasoline Association, twenty-ninth annual fall meeting, Ambassador Hotel, Los Angeles.
7-8	American Institute of Mining and Mettallurgical Engineers, Pacific Petroleum chapter, fall meeting, Biltmore Hotel, Los Angeles.
9	Southern Gas Association, field production of natural gas roundtable, Rice Hotel, Houston.
11-13	American Gas Association, annual convention, Atlantic City, N. J.
11-13	American Association of Oilwell Drilling Contractors, annual meeting, Biltmore Hotel, Los Angeles.
12-15	Eighth National Chemical Exposition, Chicago Coliseum, Chicago.
14-17	Permian Basin Oil Show, Odessa, Tex
16	Southern Gas Association, transmission management conference, Rice Hotel, Houston.
17-20	American Institute of Mining and Metallurgical Engineers, petroleum division, fall meeting, Plaza Hotel, San Antonio.
24-26	Independent Petroleum Association of America, annual membership meeting, Mayo Hotel, Tulsa.
26-27	Society of Automotive Engineers, national diesel engine meeting, Statler Hotel, Cleveland.

NOVEMBER

4-5	Society of Automotive Engineers, national fuels and lubricants meeting, Mayo Hotel, Tulsa.
8-11	American Petroleum Institute, thirty-fourth annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.

28-Dec.

3	American Society of Mechanical Engineers, Statler Hotel, New York.

DECEMBER

2-4	Interstate Oil Compact Commission, winter meeting, Drake Hotel, Chicago.

JONES SUCKER RODS

Jones Alloy Type 12 Rod

Developed to lift the increased load of wells of 10,000 ft. and more, these rods have the necessary load lifting strength with **no increase in rod size.** Yield strength of processed electric furnace alloy steel is exceptionally high. Fatigue resistance is excellent. Check the physicals charted below. Detailed information will be sent upon request.

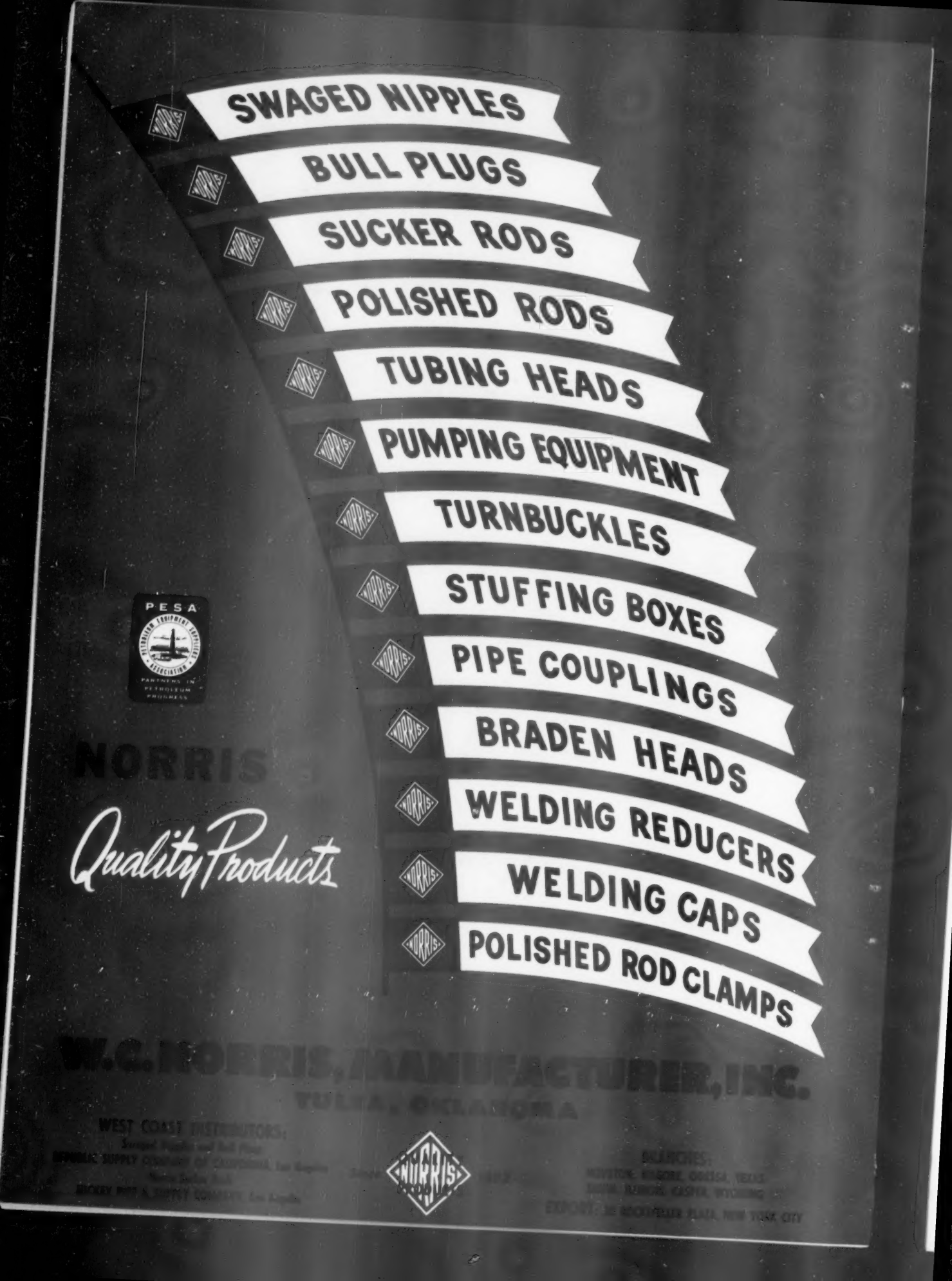
Typical Physical Properties

Yield (p.s.i.)	96,000 minimum
Ultimate (p.s.i)	120,000 minimum
% Elong. 8"	12 minimum
% Red. of Area	50 minimum
Brinell Hardness	235 minimum
Charpy Impact	45 minimum
Izod Impact	90 minimum

P·E·S·A
PARTNERS IN PETROLEUM PROGRESS

THE S. M. JONES COMPANY
Division of Buffalo-Eclipse Corporation
General Office and Factory: TOLEDO, OHIO
Sales Office: Kennedy Building, TULSA, OKLA.
Export Sales Office: Buffalo International Corp.
50 Church Street, N. Y. C.

LOOK FOR THE GREEN RODS


SWAGED NIPPLES
BULL PLUGS
SUCKER RODS
POLISHED RODS
TUBING HEADS
PUMPING EQUIPMENT
TURNBUCKLES
STUFFING BOXES
PIPE COUPLINGS
BRADEN HEADS
WELDING REDUCERS
WELDING CAPS
POLISHED ROD CLAMPS
PESA
PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION
PARTNERS IN PETROLEUM PROGRESS
NORRIS
Quality Products
W.C. NORRIS MANUFACTURER, INC.
TULSA, OKLAHOMA
WEST COAST DISTRIBUTORS:
BRANCHES:
NORRIS

THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

Published every Monday by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Oklahoma. Phone 3-6291. Founded in 1902. Name changed to The Oil and Gas Journal in 1910 by Patrick C. Boyle.

●

P. C. Lauinger, President; S. H. Rourke, Executive Vice President; Mitchell Tucker, Vice President and Advertising Manager; Hanson B. Pigman, Circulation Manager; Donald W. Wilson, Manager, Industry Census Department; J. Parker Holland, Production Manager.

EDITORIAL STAFF

TULSA OFFICE, 211 South Cheyenne Avenue, Phone 3-6291: Kenneth B. Barnes, **Editor;** Henry D. Ralph, **Chief Editorial Writer;** Ted A. Armstrong, **News Editor;** Gerald L. Farrar, **Engineering Editor;** Dr. Frank J. Gardner, **Exploration Editor;** Paul Reed, **Pipeline Editor;** John C. Reidel, **Petrochemical Editor;** C. O. Willson, **Consulting Editor;** W. L. Nelson, **Technical Editor;** Lynn M. Nichols, **Presentation Editor;** John C. Casper, **Economics Editor;** Neil Williams, **Associate Editor;** Edwin McGhee, **Drilling-Production Editor;** Norman S. Morrisey, **Drilling-Development Editor;** Paul Swain, **Assistant News Editor;** Robert G. Deering, **Assistant Pipeline Editor;** R. B. Tuttle, **Equipment Editor.**

Tulsa District Editors: Harry Taylor, Charles L. Burch, Carl Hoot, John C. McCaslin, John M. McGivern, and Carl J. Lawrence.

Tulsa Editorial Assistants: Helen Brown, Martha Allbright, Alice Burt, and Aileen Cantrell.

NEW YORK OFFICE: 500 Fifth Avenue, Phone LOngacre 4-1750: George H. Weber, **Refining Editor,** and Dahl M. Duff, **International Editor.**

HOUSTON OFFICE, 802 Sterling Building, Phone CHarter 4626: F. Lawrence Resen and William P. Sterne, **District Editors.**

DALLAS OFFICE, 1238 Mercantile Bank Building: Robert J. Enright, **District Editor.**

LOS ANGELES OFFICE, 650 South Grand Avenue, Phone VAndyke 0728: D. H. Stormont, **District Editor.**

WASHINGTON OFFICE, 621 Albee Building, Phone DI 7-1710: Bertram F. Linz, **District Editor.**

Correspondents at Denver, Pittsburgh, Calgary, Columbus, Ashland, Ky., Oil City, Pa., and Mount Pleasant, Mich.

Advertising Offices: TULSA, John D. Reilly, Mid-Continent Manager and George O. Ruppert, Representative, 211 South Cheyenne, Phone 3-6291; NEW YORK: Charles A. Wardley, Eastern Manager, and Robert N. Caird, Jr., Representative, 500 Fifth Avenue, Phone LOngacre, 4-1750; CHICAGO: E. S. Klappenbach, Midwestern Manager, and David T. Kenney, Representative, 105 West Madison Street, Phone Central 6-2537; PITTSBURGH: Alfred M. Jones, Manager, 429 Fourth Avenue, Phone Atlantic, 1-4835; HOUSTON: John M. Spears, Gulf Coast Manager, Sterling Bldg., Phone CHarter 4626; LOS ANGELES: Donald O. Hanson, Manager, 650 South Grand Avenue, Phone VAndike 0722; ENGLAND: Harry Becker, European Representative, 111 Thorley Lane, Timperley, Cheshire, Phone Ringway 4702.

●

Subscription rate to the petroleum industry, United States and foreign, 1 year, $4.00. Single copies, 50 cents. Back copies when over a year old, one dollar. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1954 by The Petroleum Publishing Co.

Member
Audit Bureau of Circulations
Associated Business Papers

JOURNALLY Speaking

New Look

LOOK at our statistics section in the back of this issue. Looks different, doesn't it? It is different, different stem to stern.

We've revised everything, both the material carried and the method of presentation. There are more changes, big and little, than we could possibly list here, let alone explain. But you can be sure that every change was the result of weeks of thinking and planning. This big revision job has been under way for 3 months.

What we did was to rear back and take a fresh look at everything we had been doing and see whether our service to our readers could be improved. We found that practically everything could be improved. John Casper, who is responsible for the entire section, will explain some of the improvements from time to time in what he writes for the first page of his section.

Right now all we're going to say is that you will get five pages of charts and tables every week instead of four, and once a month there will be a sixth page giving figures not available on a weekly basis. Every week John will discuss significant trends and developments as revealed by the week's statistics. This ought to be "must" reading for every operating man, because it will range over all divisions of the industry.

First thing you'll notice is the appearance of the charts—not so much solid black. Looks a lot neater and more interesting. Then you'll see that there's more information on these charts than before. Every 3 months the charts will be redrawn so that the current quarter will always be on the right end in black, the ancient history on the left.

Then take a look at the "quickie" table on the first page. This gives you the week's most significant figures at a glance. Details and supporting data can be found on the following pages. There's also a lot of new figures on demand — which, after all, governs the rate of activity throughout the industry.

And there's a lot more. The more you use this section the better you'll like it. We'll make a bet on that.

For the Record

IT really isn't necessary to tell an oil man how essential it is to keep a close watch on current statistics as a guide to what the industry is doing and what it is likely to do next. Nor is it news to you that the Big Yellow Book has always spent a lot of money in gathering and presenting statistics.

But we do want to get it on the record that the "new look" in our Current Statistics section is a mighty important part of our operation as well as of yours. A whale of a lot of manpower goes into this section every week, and we don't do it just for fun. We do it because the industry needs these figures and looks to us to supply them.

Just gathering figures and printing them isn't enough to serve the needs of a busy oil man. That's why we have revised our entire method of presentation to make the figures easier to find and to use. That's why we have so many charts showing trends and comparisons.

We are mighty proud of the result. Nowhere else can you get, every week, so many useful statistics on what's happening in oil. And nowhere else can you find figures presented in such a usable manner.

White on Black

JUST a note to explain why our new trends charts show the current quarter in black with white lines. We're giving away a professional secret, but we do it to save time. There is such a short interval between the time when all the figures are compiled and the deadline for starting the presses that we aren't able to have new charts drawn and photoengravings made. So at the last minute an engraver routs out the white line another notch for the current week's figures. Just an example of our usual speedy service.

—Henry D. Ralph.

They drill out faster because they are *skillfully designed to break up readily* under the drilling bit. • Consideration was given to "drillability" in the design of every part. • Furthermore, they are...

SHORT

short in length...short in drilling time

FOR WIRE LINE SETTING
contact any of these
leading service organizations:

THE FORD ALEXANDER CORPORATION
BIRD WELL SURVEYS
BJ SERVICE, INC.
THE DIA-LOG COMPANY
DOWELL INCORPORATED
HUSKY GUNS, INC.
LANE-WELLS COMPANY
McCULLOUGH TOOL COMPANY
PERFORATING GUNS ATLAS CORP.
RAM-GUNS, INC.
SCHLUMBERGER WELL SURVEYING CORP.
WELEX JET SERVICES, INC.
THE WESTERN COMPANY

SET ON WIRE LINE

Any of the leading service organizations (listed at left) can set a Baker Bridge Plug and gun-perforate on the same trip to the well. Wire line setting is so much faster than setting on tubing that the saving (particularly in deeper wells) is very much worth while.

CHOICE OF PLUGS

It's easy to select the *right* bridge plug. First, specify BAKER—and *be sure you get Baker!* If the application is temporary, and no harmful well fluids are present, choose the MAGNESIUM ALLOY Type. If the application is permanent, or if severe well conditions are present, you need the CAST IRON Type.

MOST DEPENDABLE

With a Baker Bridge Plug set in your casing, you can be sure—whether the plug is CAST IRON or MAGNESIUM—that the packing element will provide a leak-proof shut-off to hold against any pressure from above or below.

SPECIFIC RECOMMENDATIONS for using Baker Bridge Plugs are available from any Baker representative or office.

BAKER OIL TOOLS, INC. HOUSTON • LOS ANGELES • NEW YORK

BAKER BRIDGE PLUG

The additive race spells competition for refiners

COMPETITIVE selling has hit the gasoline market hard, and there is every indication that attempts to lure motorists to one brand or another will continue far into the future.

The obvious manifestation of this is the bewildering array of capital letters and new words denoting additives and special features of the various brands. Whatever these may mean to motorists, they spell just one thing to refiners: Competition.

The over-all effect of this intensive competition is good for consumers, good for the nation, and, in the long run, good for the oil industry. The immediate effect on refiners will be a frantic scramble to keep from falling behind in the race for quality and sales appeal.

The octane race has been proceeding steadily but not very dramatically, so far as the public was aware, for several years. Competition has increased the power and efficiency of gasoline at no net cost to the motorist, but advertising has been confined largely to rather unspecific claims of improved quality.

NOW a host of new chemical additives is making its appearance with a rush, promising, and doubtless delivering, improved performance and economy in various respects. Motorists may be mystified by the competitive claims, but they are responding by tanking up with the "new" fuels, often despite a slightly higher price.

Increased sales of the improved gasolines probably won't increase the total consumption of motor fuel. In fact, if the claims of greater efficiency are borne out, the total consumption per vehicle-mile might even drop a little. This presages a decline in the sale of lower-octane "regular" gasoline.

THE prospect for the refining industry, then, is a continued competitive campaign to upgrade gasoline quality, not only through more research on additives but also by construction of more new processing equipment to increase octane ratings. Plants unable to supply what customers want may have few customers.

The upcoming competition is going to provide better gasoline, whether all vehicles on the road need it or not, and that's a technological advance beneficial to the nation. The intensity of the competition should keep prices low despite the better quality, and that's beneficial to customers.

For refiners, this competition will be tough on those who are a bit behind the head of the parade. They must continue their research, modernize their equipment, and intensify their selling—and that kind of competition never ruined any industry.

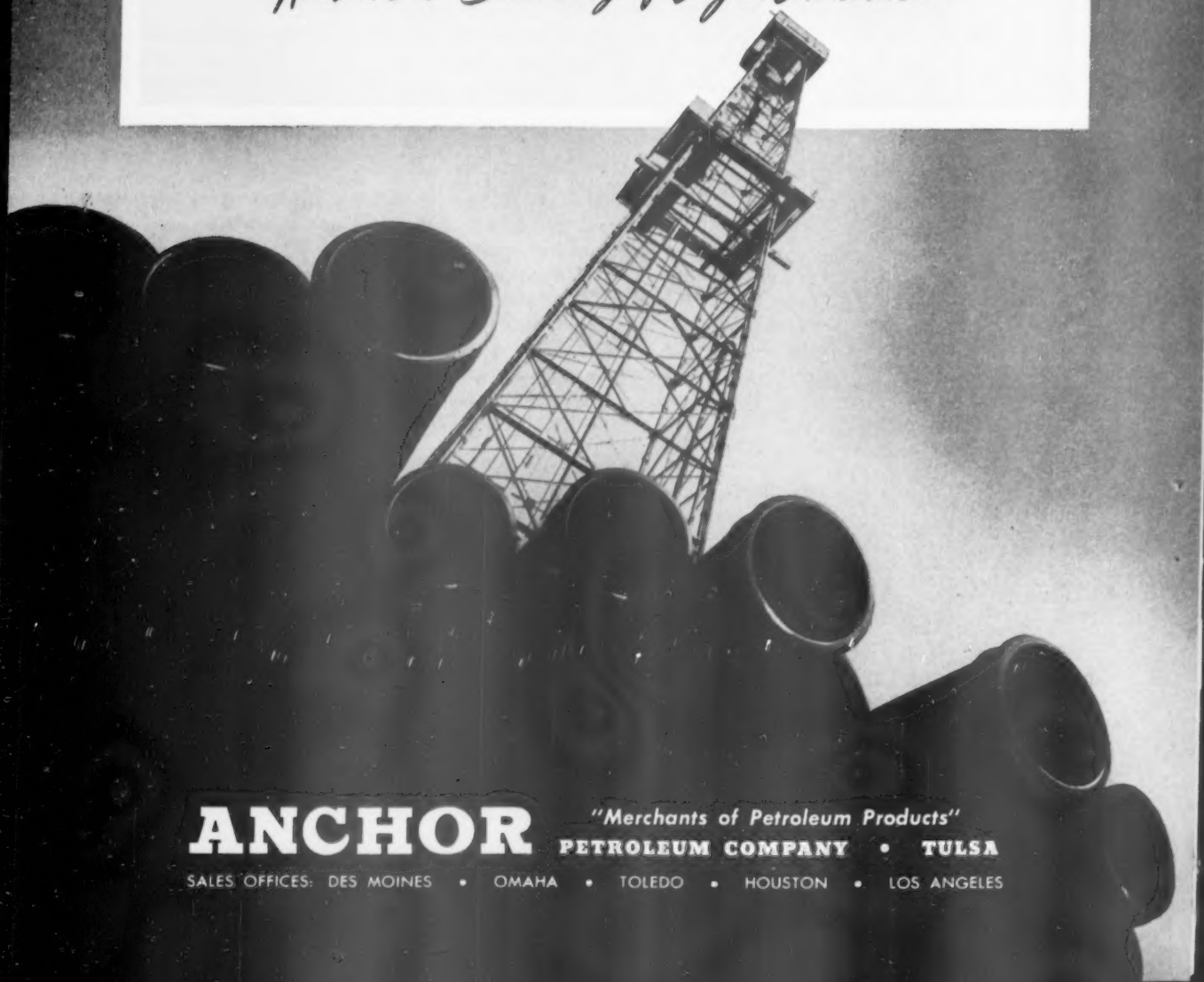
ANCHOR

BUYS AND SELLS

- BUTANE
- PROPANE
- NATURAL GASOLINE
- DIESEL OIL
- FUEL OIL
- NAPHTHA
- KEROSENE
- OTHER PETROLEUM PRODUCTS

We're shooting for your business! We want to serve as your dependable supplier or as your marketing department. That's our specialty. We can give you more time for your specialty by handling all your marketing-transportation problems. Our fleets of tank cars are ready to deliver or pick up petroleum products right at your "door." You can have more time for your business, make more money, maybe have more time for leisure fun if you'll call in the specialists in petroleum marketing—that's us—Anchor Petroleum Company —2-7261, Tulsa.

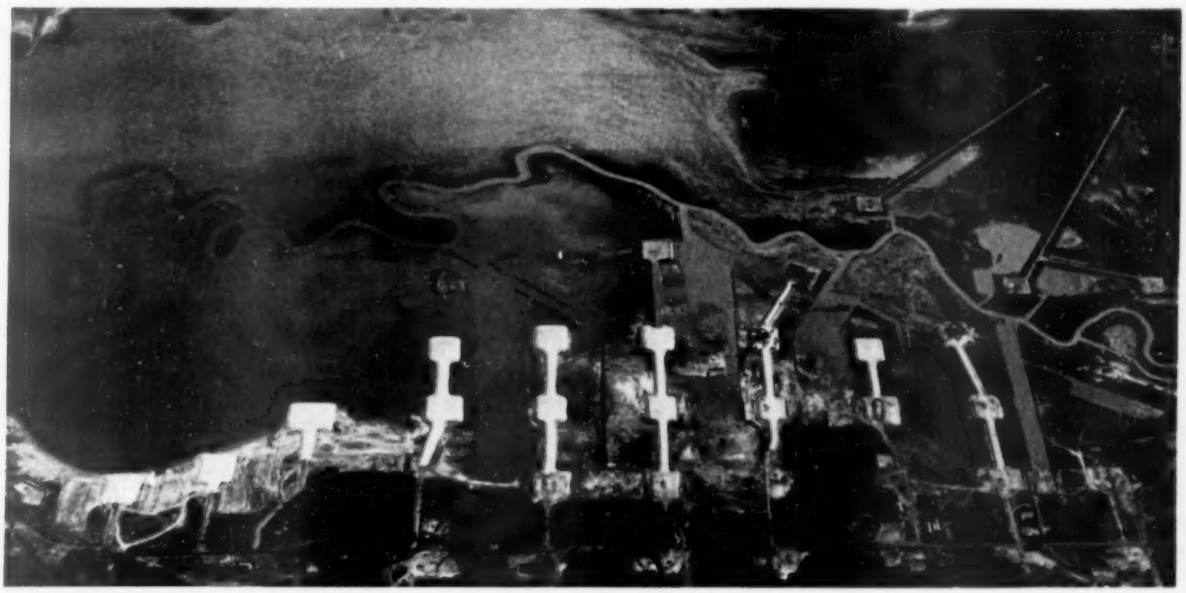
And we're Shooting for Your Business



ANCHOR *"Merchants of Petroleum Products"*
PETROLEUM COMPANY • TULSA

SALES OFFICES: DES MOINES • OMAHA • TOLEDO • HOUSTON • LOS ANGELES

THIS WEEK . . . . . IN THE NEWS



BIG MINERAL FIELD in North Texas is stepping right out into Lake Texoma. Shell Oil Co.'s plan to extend the limits of the field includes construction of 13 earthen fills built at 620 ft. above sea level from the shoreline into the lake. The fills, covered with crushed limestone, boast as many as three drilling sites each. Earth for the construction was dredged from the lake bottom creating a small canal on each side of the fills. Big Mineral Creek, partially under the low lake level can be seen winding into the big lake.

GOVERNMENT—House follows its appropriation committee recommendation and slashes Interior Department budget. . . . Dealt a near-fatal blow is the plan for enlarged Oil and Gas Division to replace PAD. . . . Funds for this agency are cut by two-thirds. . . . ¶U. S. Supreme Court now pondering limit for FPC jurisdiction over gathering and sale of natural gas. . . . Court hears arguments after agreeing to review Phillips Petroleum case. . . . ¶Sen. Paul Douglas of Illinois leads group of 14 senators in effort to repeal last year's Submerged Lands Act. . . . Douglas makes hot political issue of repeal of the act by a provision giving revenues from offshore lands to education. . . .

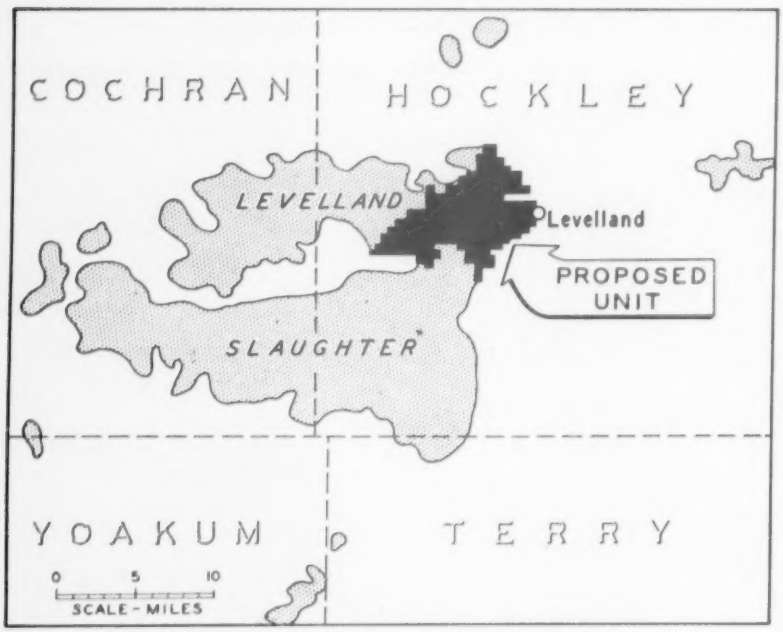
SECONDARY RECOVERY—Stanolind asks Railroad Commission approval for big unitization project in Texas' Levelland field. . . . Company proposes gas injection in area of at least 16,000 acres, figures additional recovery at 16,000,000 bbl. . . . Project would be third largest secondary-recovery unit in Texas. . . . ¶Gulf seeks permit for water flood under its North Ward-Estes field properties. . . . Project would involve 2,292 acres, recover an estimated 11,000,000 bbl. of additional oil. . . . ¶Amerada proposes unit water flood for North Von Roeder field expected to increase ultimate recovery by 8,500,000 bbl. . . . Amerada says all operating interests plus 98.7 per cent of royalty on acreage basis already signed. . . .

REFINING—Study shows increasing use of Model IV fluid catalytic cracking units. . . . Total expected to hit 22 in 2 years. . . . ¶Premier Oil completes $2,500,000 expansion that includes 3,000-bbl. U.O.P. fluid cat cracker. . . . Unit scheduled to go on stream this week. . . . ¶Dakota Oil & Refining Co. abandons plans to build 2,500-bbl. refinery at Minot, N. D.

NATURAL GAS—Texas Senate passes bill boosting natural-gas production tax from 5.72 per cent to 9 per cent of market value at the well head. . . . Amendment passed to reduce tax to 8 per cent next year and 7 per cent in 1956. . . . ¶TIPRO members pass resolution asking that Texas Railroad Commission be given power to set minimum field gas prices. . . . Flat state-wide price opposed, but association asks legislation providing discretionary powers "to prevent physical waste." . . .

INTERNATIONAL—Esso Export and California Transport are designated by Brazil's petroleum council as the companies to supply crude for two new refineries now under construction in Sao Paulo region. . . . Contract, running 5 years, is regarded as major piece of business in world oil markets recently. . . . ¶Assam Oil's Nahorkatiya discovery in Northeast India is put on 500-bbl. daily regular production. . . . ¶West Australian Petroleum arranges for two more rigs to develop Exmouth Gulf area. . . . ¶Herbert Hoover, Jr., is in Teheran paving way for final negotiations between representatives of international consortium and Iranian Government. . . .

EXPLORATION—Shell moves into Lake Texoma with 13 earthen fills, some with three drill sites each, to extend limits of Big Mineral field of North Texas. . . . ¶Carter drills below 6,880 ft. in a slant hole drilled beneath the Mississippi River from bank opposite Natchez. . . . ¶Melben Oil, Ohio Oil, and Pure Oil join in drilling 28,640-acre block off Galveston Island in the gulf. . . . ¶Standard of California completes a wildcat on the Sespe ranch near Fillmore to discover new 14,000-ft. pay. . . . ¶Union Oil's Assumption Parish discovery, 1 Williams, flows 250 bbl. of 39°-gravity crude to open new South Louisiana field. . . .



Big Unit Proposed

Stanolind asks Railroad Commission for approval of plan to unitize large portion of 75,000-acre Levelland field

Robert J. Enright

AUSTIN.—Approval of what would be the third largest unitization and secondary-recovery project in Texas was asked of the Texas Railroad Commission by Stanolind Oil & Gas Co. last week.

The mammoth project calls for gas injection into the San Andres formation underlying at least 16,000 acres and perhaps nearly 21,500 acres in the 75,000-acre Levelland field in Hockley and Cochran counties, West Texas (see map).

The project would rank in size in Texas only behind the huge programs approved by the commission for Kelly-Snyder and Goldsmith fields.

Stanolind testified that the proposed project, involving between 392 and 509 producing wells, would result in the recovery of up to 16,000,000 bbl. of additional oil valued at more than $40,000,000. This would increase primary recovery from the reservoir by about 25 per cent.

The indefinite acreage and number of wells is due to the fact that the royalty holder on more than 5,000 acres which it was hoped would be included in the unit has not yet signed the agreement.

What is involved . . . The company argued that the program would permit more flexible operation at lower cost, better conservation of energy, and increased ultimate recovery, it asked that the agreement be made effective May 1.

The maximum area proposed for the unit is 21,470.74 acres, limited on the east by the field productive limits and on the north, west, and south by non-signing interests. Operators with 91.87 per cent of the working interests on a surface-acreage basis have signed the unit agreement, Lawrence E. Brock, Stanolind's unitization superintendent, testified. About 92.34 per cent of working interests have signed on the basis of the unit participation formula, he said.

There are 1,184 royalty owners in the maximum proposed unit area, 949 or 80.15 per cent of whom have signed. These owners represent 66.75 per cent of a surface acreage basis and 65.76 per cent on the participation formula basis.

As of April 5, Brock said, 17 operators representing 100 per cent of the working interest over a contiguous area of 16,004.75 acres were committed to the unit. Other working-interest holders in the maximum proposed unit area will be permitted to come in before May 1, Brock said, and added that he expected additional tracts to become qualified before the deadline.

Injection plan . . . A gas-injection operation has been selected for the unit because lack of sufficient supply of water in the area ruled out a water flood.

Injection fluid will be residue gas from Stanolind's Levelland field natural-gasoline plant. Initially about 57 per cent of produced gas from the reservoir will be injected into the San Andres at an average depth of 4,470 ft. through 18 input wells. The latter will be converted producers.

The injection plan calls for a dispersed-type program, with the 18 initial injection wells so situated as to provide reasonable dispersion of gas throughout the unit area.

E. H. Blackaller, district engineer for Stanolind, told the commission that ultimately about 65 per cent of the produced gas will be forced back into the reservoir.

Participation . . . Participation in the unit, according to Brock, would be based 50 per cent on the allocation of allowable for the field (three-fourths on acreage and one-fourth per well) and 50 per cent on the original oil in place.

The agreement provides for construction of facilities for use by the unit operators and for producers outside the unit who wish to inject on their own hook. The producers outside the unit would be permitted to use the facilities on a cost-to-operators basis.

Cost of installing facilities and carrying on secondary-recovery operations for the life of the project was estimated by Stanolind at about $11,000,000 over the maximum unit area.

The unitization agreement provides that the unit as of May 1 must be composed of contiguous acreage signed by 100 per cent of working interests and 75 per cent of royalty interests.

Rules controversy . . . Though a majority of the larger producers in the unit area approved the unit agreement and secondary-recovery program, considerable opposition arose at the commission hearing on Stanolind's proposed "bonus" allowable credit.

This proposed rule provides a maximum credit of 20 bbl. per day for gas

injected in excess of that quantity required to remove all gas-oil ratio penalties. (Stanolind recommended a gas-oil ratio limit of 2,000:1.)

Lined up against this rule were Magnolia Petroleum Co., Superior Oil Co., Texas Pacific Coal & Oil Co., The Texas Co., and Ben Dansby et al. Going along with Stanolind were Skelly Oil Co., Sunray Oil Corp., Clardy & Barnett, and M. P. Davies and Montgomery Estate.

Elmer Patman, Superior attorney, argued that if the so-called bonus allowable ever is granted it should be only after performance data is obtained. The Texas Co. also asked that this question be deferred until after productivity of the injection area is proved by performance.

Texaco also opposed a rule which would require waivers or a hearing to inject gas into a well located closer than 1,000 ft. to a common lease or unit boundary. It asked instead for a rule providing that a maximum of 25 per cent of a full allowable could be transferred to wells nearer than 500 ft. to the unit lines.

Texas Pacific Coal & Oil proposed that the unit adopt the same rules as are currently in force in Fullerton field, to the south in Andrews County.

Earl Allison, an attorney for 22 non-signing royalty holders, strongly opposed all Stanolind proposals and asked that the hearing be continued in order that his clients might gain time to oppose the application "properly."

The reservoir . . . Levelland field was discovered February 23, 1945, and the proposed unit area has been completely developed since mid-1951.

The San Andres (Permian) is a monoclinal structure dipping to the south generally less than 1°.

There is no evidence of fracturing, and interference tests indicate effective communication between wells, according to Stanolind's Blackaller. The field is producing a small amount of water, and the average connate-water saturation is approximately 18 per cent. Blackaller said there is no evidence of water encroachment. The water-oil contact, he said, is tilted in a southeasterly direction and is found at —1,230 ft. in the northwest area, —1,370 ft. in the southeast.

Average permeability of the San Andres in the area is about 2.5 md., and average porosity about 11 per cent.

Blackaller said bottom-hole samples showed the reservoir unsaturated at the original pressure of 1,690 psi. Original oil pore-space volume in the unit area, he said, was about eight times the original gas pore-space volume.

Oil Import Tax Urged

TIPRO changes stand, asks Congress to enact tax to shave $1 per barrel differential between domestic, foreign oil

Henry D. Ralph

HOUSTON.—A resolution calling on Congress to enact an "equalization tax" on imported petroleum was adopted by the Texas Independent Producers and Royalty Owners Association at its annual meeting here.

The resolution stated comprehensive studies show that, due substantially to unequal taxation, imported petroleum enjoys an average price differential on the domestic market of approximately $1 per barrel, varying somewhat according to source.

The word "tariff" was not used by TIPRO which, in other years, has refused to ask for government assistance in its fight against imports.

Membership support for this action was won by the argument that oil produced in the United States by either majors or independents pays state and federal taxes ranging between 50 cents and $1.50 per barrel, and that imported oil should contribute a like amount to governmental revenues.

No specific rate or type of legislation was suggested in the resolution. TIPRO also voted its opposition to extension of the Reciprocal Trade Agreements Act, primarily because its peril-point and escape-clause provisions have not been effective in permitting domestic industries to obtain restoration of duties cut by these agreements.

Policy debated . . . These actions followed a full-dress debate on the administration's foreign economic policy as recently recommended to Congress by President Eisenhower on the basis of the so-called Randall report. Participants were Lamar Fleming, Jr., Houston, chairman of the board of Anderson, Clayton & Co., and vice chairman of the Randall commission; and Bryan W. Payne, Tyler, independent oil producer and past president of TIPRO.

Under questioning, Fleming admitted that the Randall commission made no specific studies of imports of oil or any other individual commodity, and that its recommendations need not be considered applicable to oil. Fleming, who is engaged in the cotton export business, said he knows nothing about oil but that it is quite possible that oil producers could make out a good case for restricting imports.

Fleming explained that the Randall report was concerned primarily with such things as foreign economic aid, currency exchange and stimulation of world trade. Payne attacked the report for being slanted in favor of export industries and failing to give consideration to the problems of domestic industries facing strong competition from imports.

J. S. WOODWARD . . .
. . . New TIPRO President

Congress expected to act . . . Debate on imports lacked the fire that has marked some TIPRO gatherings. It seemed to be taken for granted that Congress must take some action to protect the domestic market and that no relief can be expected either from the big importing companies or through administrative action in Washington.

In addition to foreign oil, chief topics of discussion were low prices for natural gas and state taxation of the industry.

With the Texas Legislature in special session considering a number of new revenue bills, much of the TIPRO debate turned on various specific proposals for higher taxes on natural gas. Conclusions were that oil and gas now pay a disproportionately high share of Texas taxes; that production taxes on gas should be based on percentage of sales price rather than a flat rate per unit; that some way must be found to permit producers to pass the taxes on to purchasers and consumers; and that the industry should draft proposals for a more equitable tax program to submit to the next legislature.

Surprise award . . . A surprise feature

of the meeting was the action of the independent producers in giving an award of appreciation to the biggest major in the country—Standard Oil Co. (N.J.) TIPRO's first annual Award of Merit was presented to Standard Oil Development Co., a Jersey subsidiary, for development of the fluid coking process, a process described as opening vast new market potentials for products of crude oil.

As explained by M. D. Bryant, TIPRO president, independents compete vigorously with the majors in production but depend heavily on them for markets and particularly for research and development of better methods and processes in all branches of the industry. To show the independents' appreciation of this and to give credit where credit is due, Bryant said, TIPRO will give an award each year and selected the fluid coking process for the first award .

E. V. Murphree, president of Standard Oil Development, and Alexis Voorhies, Jr., director of the Baton Rouge Esso Laboratories, accepted the award and explained the fluid coking process.

What coking does . . . Described as the first successful continuous process for making coke from heavy crudes and residual oils, the fluid coking process was announced to the industry last fall *(The Oil and Gas Journal, November 16, 1953, page 204, and March 22, 1954, page 130).*

The Standard officials hinted at a very bright future for the process, suggesting that it may greatly increase the market value of low-gravity crude oil by upgrading it into many refined products which will command high prices on ready markets. So versatile is it, they said, that it can convert almost any kind of hydrocarbon into high-grade gasoline and with slight modifications can produce a wide variety of new chemicals.

The process will be licensed to any refiner, but Jersey affiliates have already started three installations. The first unit, with capacity of 3,000 bbl. per day, will be completed this fall at the Billings refinery of Carter Oil Co. Next spring a 10,000-bbl. unit will go on stream at the Baltimore refinery of Esso Standard Oil Co., and a unit of 21,000-bbl. capacity is being designed for the Esso Standard Baton Rouge refinery.

The association also presented a special recognition award to William J. Murray, Jr., member of the Texas Railroad Commission, for his services to the industry in promoting conservation in Texas.

Other actions . . . In other actions, TIPRO went on record in opposition to compulsory unitization "as a matter of law;" recommended that labor unions be made subject to antitrust laws; pledged to fight for retention of the 27½ per cent depletion allowance; and urged other states to curtail crude production to market demand to the same degree as Texas.

As its new president, TIPRO elected Jack S. Woodward of Dallas, formerly a district petroleum engineer with Magnolia Petroleum Co. and now an independent producer. Other officers are H. Merlyn Christie, Houston, secretary; William T. Beard, Jr., San Antonio, treasurer; and M. D. Bryant, San Angelo, vice chairman of the executive committee.

Gas Pricing Urged

TIPRO reverses field, asks Texas Legislature to give Railroad Commission power to set field prices for gas

HOUSTON.—A resolution asking the Texas legislature to authorize the Railroad Commission to set minimum field prices for natural gas was reluctantly adopted here by the membership of TIPRO.

A minimum-price proposal has been a controversial issue in TIPRO for several years, but always before the members have rejected it because of their adherence to free enterprise and opposition to all forms of state or federal regulation.

The theory behind the change of policy is that the Federal Power Commission will move in and set field prices unless Texas "preempts its state's rights" —and the producers prefer state regulation to federal control.

No specific plan was outlined, but the association voted to support legislation to give the Railroad Commission the power to establish minimum well-head prices in individual fields when, after notice and hearing, it is found that this would prevent physical or economic waste. The resolution makes it plain that TIPRO does not favor a flat statewide price for gas but wants the commission to have discretionary powers limited to enforcing conservation.

What's behind it . . . A series of events in Washington during the past year caused the independent producers to reverse their stand on minimum prices:

. . . **In the case of Phillips Petroleum Co.** a federal court directed the FPC to establish prices for gas sold to interstate pipelines by producers and processors. The Supreme Court heard arguments on an appeal last week. *(See National Affairs).*

. . . **In the case of Northern Natural Gas Co.** another court upheld FPC in refusing to accept the prevailing field price as the value of gas produced by an interstate pipeline.

. . . **Bills have recently been introduced** in Congress directing FPC to fix field prices for gas sold in interstate commerce.

If and when Texas enacts a minimum-price law, its first application probably will be in the Hugoton and Panhandle fields where field prices for gas are much lower than those in adjacent areas of Oklahoma and Kansas where state-set minimum prices are in effect.

In their discussions the producers were outspoken in their denunciation of what they called the imminent threat of nationalization of the oil and gas industry through enlargement of the field of regulation of the Federal Power Commission. In other resolutions they called for a number of other things which might have the effect of increasing well-head prices for gas, including:

. . . **Study of the dedication requirements** of FPC in approving new gas pipelines, with a view of securing modifications which might make it easier for producers to altar long-term price contracts.

. . . **An attempt to modify** by court action, if feasible, dedication contracts which prevent royalty owners from electing to take their royalty in kind instead of in cash, as is permissible in oil production. This would make it possible for royalty owners to sell their share of the gas to another purchaser if dissatisfied with the price obtained by the producer.

. . . **Opposition to federal legislation** giving pipelines the right to condemn areas for underground gas storage "pending a study of the degree to which such projects result from artificially depressed well-head prices in Texas." (Individual members admitted that this is primarily an attempt to gain a bargaining position in their efforts to induce pipelines to raise field prices in old contracts.)

. . . **A campaign to make producers** "B.t.u. conscious." The idea is that gas would command higher prices if sold on the basis of its hydrocarbon content and heat value.

Senate Boosts Gas Tax

Texas measure boosting gas production tax to 9 per cent of market value assured passage by action of state senate

AUSTIN.—A bill which, among other things, would boost the production tax on natural gas in Texas from the present 5.72 per cent to a flat 9 per cent of market value at the well head was passed last week by the state senate.

The big tax boost, a part of the state administration's revenue-raising measure, was made somewhat more palatable to producers, however, when the senate accepted an amendment providing annual reductions in the tax rate.

The amendment, backed by Sen. A. M. Aiken, Jr., of Paris, would cut the tax to 8 per cent effective September 1, 1955, and to 7 per cent on September 1, 1956. The 9 per cent rate would take effect the first of September this year. The rates, as specified earlier by the committee, would have been 9.06, 8.06, and 7.06 per cent, respectively. These were rounded off due to efforts of Sen. Wardlow Lane, of Center.

Aiken contends the state will collect about the same amount of revenue (between $13,000,000 and $14,000,000 at 9 per cent) with the reduced rate in 1955 and 1956 due to increasing price and production of gas.

The senate's action virtually assured passage of the tax boost. The bill, already passed by the house, will have to go back to that body for approval of the sliding-rate-reduction amendment but this is considered assured. House reapproval is the final legislative step. The bill as it now stands also is reported acceptable to administration leaders.

Lane amendment defeated . . . The state affairs committee and then the senate itself turned down another Lane amendment which would have taxed only residue gas.

The Lane tax, two-fifths of a cent per M.c.f., or 5 per cent of market value, whichever were the smaller, would have been on production at the well head, but the gas would have been measured for tax purposes at the outlet of the gasoline plant.

Lane proposed that this tax be substituted for the production-tax boost provided in the administration bill, arguing that the tax on liquid hydrocarbons from gas should not be raised from 5.72 per cent since they are in competition with crude oil, which is taxed at only 4.6 per cent at the well head.

The only other major change in the bill approved by the committee was an amendment clarifying the law with regard to oil-well servicing taxes. There has been considerable confusion over who is to pay the tax on well surveys. The amendment was explained as exempting geologists from payment of the tax.

The senate beat down, in addition to Lane's amendment, one proposed by Sen. Searcy Bracewell, which would have dropped the 9 per cent production tax back to the present 5.72 per cent after 1 year.

Other action . . . The state affairs committee is scheduled to consider this week the bill passed by the house last week imposing a token tax of one-thirtieth cent per M.c.f. on the dedication of gas reserves (*The Oil and Gas Journal, April 5, page 69*). The measure was passed in the house to test its validity with a view to using it, if proved valid in the courts, to replace the production-tax increase.

The house oil, gas, and mining committee meanwhile continued its fight over two bills providing for minimum well-head gas prices in Texas. These were Rep. Jack Bryan's bill to let the Texas Railroad Commission fix gas prices by fields and Rep. Robert Patten's bill providing a state-wide minimum gas price of 7 cents per M.c.f.

The bills are considered to have little chance of passing both houses of the legislature before the special session ends April 13.

New Premier Cat Cracker Goes on Stream

FORT WORTH.—Premier Oil Refining Co. completes a $2,500,000 expansion program at its refinery here this week.

Major unit in the expansion is a 3,000-bbl. U.O.P. fluid cat cracker with integrated gas-concentration, polymerization, and treating facilities. The cracking unit, which has a 74 per cent conversion factor, will employ a conventional synthetic clay catalyst to process a charge of virgin heavy gas oil.

Cost of this unit, scheduled to go on stream this week, was set at about $2,000,000. The other $500,000 was spent for modification of feed preparation and other existing facilities.

Completion of the program will balance out plant facilities to permit refinery runs of up to 7,800 bbl. daily, according to L. B. Connelley, refinery superintendent. Gasoline quality will be upgraded substantially.

Construction contractor was Refinery Engineering Co., Tulsa.

Major units at the refinery, in addition to the new cracker, include a 7,800-bbl. crude-distillation unit, a 2,000-bbl. vapor-phase thermal cracker, and a 1,750-bbl. Platforming unit.

Crude oil for the plant is obtained through Premier's own gathering system from Ranger field, about 90 miles southwest of Fort Worth.

Big Floods Planned

Gulf estimates secondary recovery from proposed flood of North Ward-Estes field in Texas at 11,000,000 bbl.

AUSTIN. — The past 10 days have been big ones for secondary recovery in Texas.

During this period, the Texas Railroad Commission heard applications for permits to conduct water floods in two large projects and four smaller ones, in addition to Stanolind Oil & Gas Co.'s mammoth project in Levelland field of Hockley County, West Texas.

Biggest of the major floods, estimated to recover roughly 11,000,000 bbl. of additional oil from the Yates sand, was proposed by Gulf Oil Corp. for its properties in North Ward-Estes field, Ward County, West Texas.

Other applications provided for:

1. Unitization and water flooding of the Canyon Reef formation in North Von Roeder field, Borden County, West Texas, with Amerada Petroleum Corp. the operator.

2. Water flooding the Gunsite sand underlying leases owned by Gulf, Magnolia Petroleum Co., and Chapman & McFarland, and totaling 550 to 650 acres in Wichita County Regular field, Wichita County, North Texas.

3. Commencing a pilot water-injection project in the Chalk sand underlying Gulf's H. R. Clay lease in Howard-Glasscock field, Howard and Glasscock counties, West Texas.

4. Starting a pilot water flood in the Garvey Strawn sand under Texas Consolidated Oils' Bavousett lease in Garvey (Strawn) field, Young County, North Texas.

5. Flooding the Soma sand underlying four Delhi Oil Corp. leases in Noelke field, Crockett County, West Texas.

North Ward-Estes project . . . Gulf's application to flood its properties in North Ward-Estes field was the latest and the biggest of a large number of floods proposed in recent months for the field.

The project, as planned, takes in about 2,292 productive acres in the field with 147 producing wells (four more temporarily abandoned), and it may be expanded later.

More than 50 wells will be converted to injection service, and about 24 more will be drilled. Another 11 wells will be drilled as producers.

Testifying for Gulf, Rush Vann, petroleum engineer, said the reservoir, comprising about 22,600 acres, is a north-south trending anticlinal structure composed of blanket shaly sands separated by impermeable dolomite with occasional sand stringers. Exact limits of the field are still in the process of being defined.

The Yates sand in the field, he said, averages about 28 ft. thick and is topped at an average depth of 2,600 ft. The first well in the area was completed in August 1936, and the reservoir is in the late stage of depletion.

Brackish water obtained from the Delaware reef at about 3,700 ft. would be used for injection in a closed-type system. The company would use a 20-acre, five-spot injection pattern along the lease boundary and a 40-acre, five-spot pattern in the central portion of the lease. Injection would be by gravity initially, with surface pressure building up to about 500 psi. later. Daily injection rate is planned at 500 bbl. per well per day.

Gulf asked that: (1) it be permitted to expand the project without a hearing, (2) the yardstick allowable be applied to all producing and injection wells in the project, exempt from shutdown days, (3) allowables from injection wells be transferred to producing wells, and (4) increases in allowables resulting from the flood be added to the field MER in effect at the time.

North Von Roeder . . . Amerada told the commission that 100 per cent of the operating interests and royalty interests representing 98.7 per cent of the surface acreage in North Von Roeder field have signed a proposed unitization and operating agreement.

Evidence submitted by J. C. Blackwood, Amerada division petroleum engineer, showed that the proposed flood would increase ultimate recovery to about 8,500,000 bbl. of oil—more than twice the 4,000,000 bbl. estimated to be recoverable under primary methods. Original oil in place he estimated at 15,500,000 bbl.

Cost of initiating and continuing the program throughout the life of production Blackwood estimated at $400,000. In contrast to this, he said, the value of the additional oil recovered would come to about $11,250,000.

Blackwood told the commission there are 29 producing wells in the 1,160-acre field—23 of them flowing. About 7,500 bbl. of salt water daily from sands at 250 to 700 ft. would be injected through three wells at the edges of the field. Water would be injected into both the oil column and below the oil-water contact. The Canyon Reef in the field is topped at an average 6,835 ft., and net pay thickness is 30.1 ft.

The injection rate would be maintained at 7,500 bbl. daily, Blackwood said, until the present pressure of 1,655 psi. is built back up to the original 1,800 psi. More injection wells and added capacity may be needed to control the flood as the field begins to produce injected water, he said.

Wichita County Regular . . . Magnolia Petroleum, acting both for itself and for Chapman & McFarland, asked permission to flood the Gunsite under three jointly owned leases in Wichita County Regular field.

Testimony disclosed that there are now 12 stripper wells on the 300 to 400 acres which will be flooded on these leases. Magnolia's Trace Kennedy estimated that the project, which would involve drilling 13 new injection wells to the 1,920-ft. pay and converting four producing wells to injection service, would result in the additional recovery of 1,000,000 to 2,000,000 bbl. of oil.

The project would operate with a closed-type system and a 20-acre, five-spot flood pattern. Salt water obtained from the Ellenburger at 3,000 ft. would be injected at a per-well rate of 150 bbl. daily and at an initial pressure not to exceed 700 psi.

Gulf asked that it be permitted to flood the Gunsite under its 250-acre R. J. Miller lease, also in Wichita County Regular field. Present plans call for drilling 11 injection wells and 12 additional oil wells. There currently are only three wells on the lease, producing an average of 3.3 bbl. per day each.

Gulf would adopt the same closed system and 20-acre, five-spot injection pattern. Initial injection would be by gravity at a rate of about 500 bbl. per day per well. Brackish water for injection would be obtained from the Canyon formation at 2,650 ft.

Bradley to Control Condor

DALLAS.—Bradley Oil Co. here has acquired what appears to be a majority interest in Condor Petroleum Co., Abilene.

Robert J. Bradley, president of Bradley Oil, a wholly owned subsidiary of San Juan Exploration Co., Dallas, said he could not as yet reveal percentage of stock purchased or the purchase price. He did say, however, that all of former

officers and directors of Condor had resigned.

Bradley will be the new president, V. B. Harris vice president, and Lionel E. Gilly, treasurer.

Condor Petroleum Co. is a large producer in West Texas. Its production, primarily from Round Top field in Fisher County and Good field in Borden County, totals about 4,500 bbl. of oil daily.

West Texas Active

First quarter sees 70 oil discoveries in 8 and 7-C

MIDLAND.—Exploratory drilling accounted for 70 oil discoveries during the first quarter of 1954 in Districts 8 and 7-C, one of the nation's most active areas, according to the Texas Railroad Commission.

These strikes include extensions to new areas and new pay zones in or near producing fields. The gain in discoveries and increase in average depth follows the deeper drilling trend which started shortly after World War II.

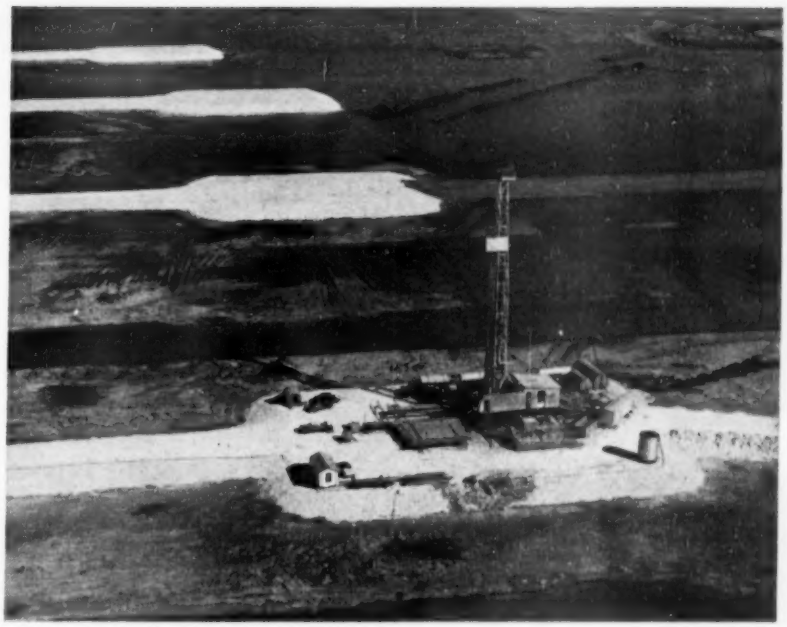
In first-quarter operations, Midland district led with 55 discoveries, compared with 29 in the first 3 months of 1953. Andrews County accounted for the highest score in District 8, with 10 wells classed as discoveries. Other counties in this district and their discoveries were Pecos and Gaines, 6 each; Dawson and Ector, 4 each; Midland, Kent and Ward, 3 each; Yoakum, Winkler, Crane and Borden, 2 each; Cochran, Mitchell, Scurry, Sterling, Hockley, Howard, Lynn and Martin, 1 each.

In the San Angelo district, first-quarter discoveries this year totaled 15, compared with 24 for the same period last year. Discoveries in District 7-C by counties were Runnels 3; Sutton, Upton, Tom Green and Schleicher 2 each; Concho, Crockett, Coke and McCulloch, 1 each.

Rotary rigs holding up . . . A count of active rotary rigs by Reed Roller Bit Co. shows Andrews County leading in the Permian basin with 73 active operations. Lea County, New Mexico, another hot spot in the basin, was right behind with 72 rotaries turning. Total rotary rigs in operation in the Permian basin on March 25 was 497, only 3 under the same period a year ago.

Most active counties were Andrews with 75 operations, Coke 24, Crane 24, Ector 29, Gaines 28 and Howard with 28.

Fifteen rotaries were drilling in Spraberry trend fields on March 25.



Dirt Fills Expand Lake Drilling

SHERMAN Tex.—Shell Oil Co. has expanded its Lake Texoma offshore drilling by locating more than 30 well sites on 13 earthen fills built into the lake.

J. D. Goodrich, Wichita Falls, North Texas division production manager, said the fills were constructed in an effort to extend the limits of the Big Mineral field in North Texas. The 13 fills, some extending ½ mile from the west shore, cover nearly 2 miles of the Big Mineral Creek Bay.

The fills are capable of providing as many as three well sites each. They were constructed at 620 ft. above sea level and linked to the shoreline with roadways.

Thirteen wells have been completed as commercial producers. Their total initial production was approximately 1,900 bbl. per day. Two additional wells are drilling and the company's plans call for a continuous drilling program in Lake Texoma throughout the remainder of the year, Goodrich said.

Shell launched the earthen fill program after available information indicated that full development of the productive acreage on Shell's T. D. Green lease would require drilling in locations that are subject to periodic flooding. The company decided on the program after conducting a survey of all possible methods of drilling and producing wells in the lake bed.

Big Mineral field was discovered in December 1951 by the Humphrey-Barnes well, in which Shell had an interest. Since that time, the company, which also is operator for other interests in the field, has completed 38 commercial wells. The wells produced nearly 46,000 bbl. during January.

Deer Park Ruling Reversed

AUSTIN.—The Texas Supreme Court has ruled that the city of Deer Park, Tex., is fully within its rights in annexing land occupied by Shell Oil Co.'s nearby refinery and chemical plant.

The court upended rulings to the contrary by both district and appellate courts.

Shell had brought quo warranto proceedings to kill the annexation of the properties. The annexation was held invalid in District Court, and Deer Park was permanently enjoined from annexing the property. The Appellate Court upheld the invalidation of the annexation but struck out the perpetual injunction.

Drilling Film Available

DALLAS.—A new motion picture, "Rotary Drilling Fluids," has been made available to the industry by the American Petroleum Institute's Division of Production. The 16 mm. film was produced in sound and color by the University of Texas with the aid of an advisory committee from the Division's Southwestern District Committee on Drilling Fluids. One print of the new movie is available for loan from the Division's office in 300 Corrigan Tower Building, Dallas.

Vital Statistics

Name: S.S. Marine Dow-Chem.

Length: 551 ft.

Beam: 68 ft.

Cargo: Perchloroethylene, methylene chloride chloroform, carbon tetrachloride, ethylene dichloride, styrene, glycols, hydrochloric acid, and 73 per cent caustic soda.

Draft: 29 ft. 7¾ in. (loaded).

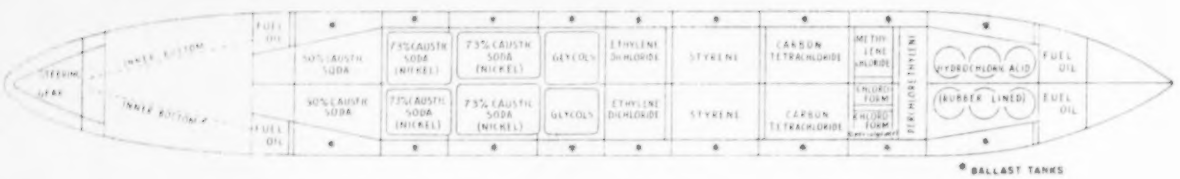
Speed: 15 knots.

Complement: 42 officers and men.

Power: Twin turbines driving one four-bladed bronze propeller with a 19 ft. diameter.

Displacement: 23,000 tons (loaded).

First of Its Kind: New



Tanker Carries Liquid Chemicals

F. Lawrence Resen

FREEPORT, Tex.—The world's first tanker specifically designed and built to carry liquid chemicals has gone into service between the Gulf Coast and Eastern Seaboard terminals.

Owned and operated by Marine Transport Lines, Inc., the Marine Dow-Chem was designed and built for lease to Dow Chemical Co., which will use it to move chemicals produced by Dow's Texas division.

The 18,000-ton vessel will carry up to 16,000 long tons — or 3,500,000 gal.—of as many as 11 different chemicals.

Unusual precautions against contamination make the ship different from conventional tankers. Double bulkheads throughout the ship guarantee at least two thicknesses of steel between any two cargoes and between any single chemical and the sea water in ballast tanks or outside.

A more complicated design feature is the loading and discharge facilities. Because of the diversity of products handled, and the necessity of maintaining purity in transit, a separate transfer system—pipes, pumps, connections, and vents—was installed for each different product to be carried.

This arrangement makes it possible to load or discharge all sections of a varied cargo simultaneously and without possibility of contamination.

A particularly difficult product to handle is the 73 per cent caustic soda, which required use of more than 100,000 lb. of commercially pure nickel in construction of tanks and lines. Tanks are nickel-clad, while transfer lines and pumps are solid nickel. In addition, heating coils of pure nickel were installed in each tank to keep the caustic in liquid state.

Another Marine Dow-Chem feature is its cathodic-protection installation. Magnesium anodes weighing 60 lb. each are bolted to the hull in groups of 30. There are three of these groups, one forward, one aft, and one amidships of each side of the ship. All groups are in line with the roll keel of the vessel and are expected to help keep the hull virtually corrosion-free during active service.

The Marine Dow-Chem will operate initially between the Gulf Coast and terminals at North Charleston, S. C.; Carteret, Paulsboro, and Bayonne, N. J.; and Dow's, Allyn's Point, Conn., plant. Future ports of call are expected to be Central and South American ports.

The new chemical tanker was built in the Quincy, Mass., yard of Bethlehem Steel Co.'s shipbuilding division. While it is the first specifically designed for chemical transportation, Dow has been using since 1949 a converted tanker for the work. Much of the know-how which went into the design of the new ship was gained from operation of the converted tanker.

Dow Acquires Shale Company

FREEPORT, Tex.—Dow Chemical Co. has acquired 85 per cent of the stock in Columbia Oil Shale & Refining Co. in a $1,500,000 transaction.

Columbia owns approximately 7,600 acres of oil-shale-bearing properties in western Colorado. No immediate plans have been made for the development of the properties, Dow said.

The purchase was part of a long-range program to assure a supply of raw materials, Dow said.

Model IV Use Spreads

Within 2 years world refineries will have 22 Model IV crackers with charge capacity of 373,720 bbl. daily

NEW YORK.—A total of 13 new Model IV fluid catalytic cracking units are now in operation here and abroad, almost 18 months after the first units went on stream at Pan-Am Southern Corp.'s Destrehan, La., refinery.

Within the next 2 years, the number of the Model IV units will have grown to 22 with an aggregate charge capacity of 373,720 bbl. per day. Of the units under construction or planned, three are in Canada and one each in India, Colombia, Japan, Australia, the Philippine Islands, and one in California.

The Model IV unit differs from its predecessors mainly in its simplicity and lower cost. It employs an entirely new system of catalyst circulation which permits a lower profile — with units standing less than 100 ft. in height having capacities comparable to earlier units standing 140 ft. or higher.

Standard Oil Development Co., an affiliate of Standard Oil Co. (N. J.), developer and licensor of the unit, says vessel design, including internals of both reactor and regenerator, are greatly simplified resulting in an estimated 30 per cent saving in steel requirements and materially reduced initial and maintenance costs.

A notable feature of the Model IV unit is the catalyst transfer system, which employs two U-bends to transfer regenerated and spent catalyst between the reactor and regenerator, thereby eliminating the conventional long standpipes and dual slide-valve arrangements.

A reduction in operating personnel requirements of the Model IV unit is the result of grouping of controls at a single level near the ground.

MODEL IV UNITS CONSTRUCTED, BUILDING AND APPROVED

Company and location—	Capacity total feed	Date on stream	Builder
PLANTS IN UNITED STATES			
Pan-Am Southern Corp.:			
Destrehan, La.	15,000	Nov. 1952	Lummus Co.
Esso Standard Oil Co.:			
Everett, Mass.	24,000	July 1953	Foster Wheeler Corp.
International Ref., Inc.:			
Wrenshall, Minn.	4,880	Aug. 1953	Lummus Co.
Lion Oil Co.:			
El Dorado, Ark.	10,800	Dec. 1953	Lummus Co.
Pan American Ref. Co.:			
Texas City, Tex.	30,000	Jan. 1954	Lummus Co.
Standard Oil Co. of Calif.:			
El Segundo, Calif.	55,000	(Aug. 1954)	Fluor Corp., Ltd.
Total	139,680		
PLANTS OUTSIDE UNITED STATES			
Imperial Oil, Ltd.:			
Edmonton, Alta.	11,000	Dec. 1952	Foster Wheeler Corp.
Sarnia, Ont.	25,000	Mar. 1953	M. W. Kellogg Co.
Ioco, B. C.	12,600	Nov. 1953	Bechtel Corp.
Regina, Sask.	13,600	(May 1954)	Fluor Corp., Ltd.
Halifax, N. S.	27,000		
Esso Standard Soc. An. Fr.:			
Port Jerome, France	15,400	July 1953	Foster Wheeler Corp.
Esso Standard Ref. Soc. An.:			
Antwerp, Belgium	9,360	July 1953	Lummus Co.
Cie. Francaise de Raf.:			
LaMede, France	14,740	July 1953	Lummus Co.
Esso, A.G.:			
Hamburg, Germany	9,360	Dec. 1953	Gutehoffnungshuette, A.G.
Standard-Vacuum Oil Co.:			
Durban, S. Africa	9,740	Jan. 1954	Foster Wheeler Corp.
Bombay, India	9,360	(July 1954)	Lummus Co.
Empressa Col. de Pet.:			
Barrancabermeja, Colombia	19,280	(Aug. 1954)	Foster Wheeler Corp.
California Tex. Oil Co., Ltd.:			
Batangas, Philippines Islands	10,800	(Oct. 1954)	Foster Wheeler Corp.
Yokohama, Japan	10,800	(Nov. 1954)	Arthur G. McKee & Co.
Kurnell, Australia	30,000	(June 1955)	Foster Wheeler Corp.
Standard Oil Co. of B. C., Ltd.:			
Vancouver, B. C.	6,000	(Nov. 1954)	Fluor Corp., Ltd.
Total foreign	234,040		
Total	373,720		

N.L.R.B. Gets Stock Plan

WASHINGTON. — Richfield Oil Corp. last week challenged contentions of the Oil Workers International Union that it should have bargaining rights on terms of a company stock-purchase plan for employes.

In arguments filed here with the National Labor Relations Board, April 8, Richfield attorneys warned that the question extends into the very ownership and control of a business operation and declared that the voluntary plan is not bargainable.

It is the first time the question, raised by Oil Workers International Union, has come before the N.L.R.B. The plan gives promise of future benefit to employes and is expected to be adopted by other oil companies if it proves successful.

Richfield established the stock purchase plan last July. Under the voluntary plan an employe can elect to save up to 5 per cent of his pay per month by depositing it in a trust fund. The company then deposits an amount equal to one-half or more of the employe's saving and the trustee invests the money in Richfield stock.

Industry Briefs

CALGARY.—Royalite Oil Co. has placed on stream the crude-distillation unit of its new 5,000-bbl. refinery being built at Kamloops. The unit is processing crude from Redwater field, moved westward by the Trans Mountain pipeline. Construction on the refinery began last July. Work on catalytic cracking unit, polymerization unit, and gas-concentration facilities is under way and scheduled for completion early next year.

LOS ANGELES.—Union Oil Co. of California's new $6,100,000 tanker, Avila, which will carry 143,000 bbl. of oil at a cruising speed of 15.5 knots, is on her maiden voyage.

MILWAUKEE.—The name of Petco Corp., which operates refineries at Chicago, Ill., and Marrero, La., has been changed to Clark Oil & Refining Corp. to more clearly identify the many divisions of the company with its products. In the past many of the firm's operations have operated under other names as divisions of Petco Corp.

Wildcat Completed

California discovery eyed as key to important field

LOS ANGELES.—Standard Oil Co. of California's wildcat on the Sespe ranch 5 miles west of Fillmore has resulted in a new 14,000-ft. oil discovery. It is not in the class of Ventura Avenue, 15 miles southwest, but it is expected to develop into a field of importance.

The wildcat was completed flowing at the rate of more than 500 bbl. of 27° gravity crude daily through a 21/64-in. choke. Production was through perforations at 14,170-14,235 ft. in a sand of Pliocene age. The crude flow was accompanied by 457 M.c.f. of gas and a 1.1 per cent water cut.

Standard holds approximately 3,000 acres around the wildcat, mostly in the large Sespe Ranch. General Petroleum Corp., Humble Oil & Refining Co., and Richfield Oil Corp., also have acquired considerable acreage in the area. Richfield reportedly has leased much of the town of Fillmore, where ordinances providing for drilling from designated islands already have been prepared. The new discovery has been labeled the Spaulding pool of the Fillmore field.

The completed well represents the third hole Standard drilled into the pay. The first was carried to 14,503 ft. but because of mechanical conditions a formation test could not be successfully completed. The hole was plugged back to 13,100 ft. and then redrilled to 14,000 ft. In a formation test of this hole, which was bottomed 100 ft. south of the first, gas at the rate of 8,000 M.c.f. daily and some condensate was produced.

In the belief oil would be discovered down-structure, the hole again was plugged back and redrilled. In this case it was plugged back to 11,150 ft. and redrilled to 14,315 ft., where a combination string of 6⅝ and 7-in. casing was run for completion. Bottom-hole location of the well as completed is about 1,000 ft. south and 250 ft. east of the surface location in SW SW 27-4n-20w.

Owners Urged Not to Lease

LONG BEACH.—Members of the Property Owners Oil Development Association were urged by B. U. Carleson, Long Beach vice-mayor, not to sign leases with private companies for development of oil reservoirs expected to underlie their city properties. The area in question is comprised of about 600 acres in a triangular section east of Pine Avenue.

The vice-mayor warned that the city could not be expected to negotiate cancellation of leases, that the city is authorized to deal only with the landowners in accordance with a charter amendment voted January 21.

Owners were urged to wait until the city is ready to let contracts for development of the huge reserves expected to lie offshore. Leaders of the association believe that if all 1,800 property owners act as a group, they will be able to realize more from their oil rights.

Ohio Fishes at 16,000 Ft.

BAKERSFIELD Calif. — The Ohio Oil Co. was fishing at a depth of about 16,000 ft. in its world's depth record holder at the Paloma field 15 miles southwest of here. April 9 was significant as it marked the 900th day since the deep test was spudded. Ohio has been fishing for the past 6 months in an effort to recover stuck drill pipe from almost the total depth of 21,482 ft. If the hole can be cleared, it is planned to run casing to test saturated sands encountered between 16,000 and 18,000 ft.

Pilot Flood Promising

LONG BEACH, Calif.—Water injection into a shallow, upper Terminal oil pool in the Harbor area of Wilmington field has started a levelling off of the declining oil-production curve.

It is too early to predict that the trial flood will raise oil recoveries and offset surface subsidence. However, the fact that the decline curve is showing a trend toward levelling off, in spite of a drop of gas-oil ratios from 800 to 400 cu. ft. per barrel, indicates that an oil drive is being created.

The project is being carried on in a small, three-well subpool on city oil properties operated under contract by Long Beach Oil Development Co. Almost 1,000,000 bbl. of filtered ocean water has been injected through two input wells since the flood was started 10 months ago.

The brine, at a rate of about 4,500 bbl. daily, has been supplied by a single 120-ft. well whose sands are being constantly replenished by ocean waters. Frank Hardesty, chief petroleum engineer for the Long Beach Harbor Department, said a second water well is planned in order to increase the injection rate. He has recommended stepping up the rate to 15,000 bbl. a day.

Fullerton Oil Sale Assured

LOS ANGELES.—Sale of Fullerton Oil Co. capital stock to Chicago and New York interests, who then are expected to sell the oil properties to Monterey Oil Co. for a little cash and deferred oil payments, seemed assured last week.

W. W. Valentine, Fullerton president, on April 6 announced that more than 80 per cent of the outstanding stock had been placed in escrow with a Los Angeles bank. A contingency of the offer of Alban Corp. and Church Oil & Gas Co. to purchase the stock at $71.55 a share, making it a $52,000,000 deal, was that not less than 80 per cent of the stock be deposited by April 15.

Next Week – Spotlight on Exploration

A WIDE range of geological information will be featured in next week's issue of The Oil and Gas Journal—the annual Exploration Number.

One of the highlights of the special issue will be a 28 by 35-in. insert map of gravity anomalies of the United States with special emphasis on Texas and Oklahoma. The multicolor map will be accompanied by a comprehensive article written by Lester L. Logue, vice president of Exploration Surveys, Inc., Dallas.

A geophysical symposium on pattern shooting and multiple geophones also will be in the April 19 number.

In addition to these features will be several other important exploration items such as the annual exploration survey conducted by Frederic H. Lahee and a review of geophysical activity in the United States and Canada by Sigmund Hammer.

Another Journal exclusive that will appear will be a series of digests of selected papers presented at the joint annual meeting of the American Association of Petroleum Geologists, the Society of Exploration Geophysicists, and the Society of Economic Paleontologists and Mineralogists.

Interior Budget Slashed

House appropriations committee says plans for enlarged Oil and Gas Division "out of proportion" to need, duties

Bertram F. Linz

WASHINGTON. — Interior Department plans for a big new Oil and Gas Division were practically wrecked last week by an unsympathetic House appropriations committee.

The committee recommended that the House provide only $100,000 instead of the $300,000 asked by the agency for operation during the fiscal year beginning July 1. The Oil and Gas Division will take over duties of the Petroleum Administration for Defense, which is in the process of being disbanded.

The committee's recommendations were approved by the House April 6 and the bill is now awaiting Senate action.

The budget recommended by the House committee would limit the OGD staff to even fewer than the 23 employes provided by an appropriation of $106,559 for fiscal 1949, the last year of pre-Korea operation. The budget asked by the agency would have supported a staff of 23 employes with salaries in excess of $5,000 a year and 13 with lesser salaries.

The committee recommendation said, "While the function of pulling together in one place all current data on petroleum and gas resources and their utilization is a continuing service to both Government and industry, the high cost structure proposed in the budget appears to be out of all proportion to the workload involved or the needs for the service rendered.

"The appropriation allowed compares reasonably with amounts which were appropriated for these activities prior to the time they were consolidated with the Petroleum Administration for Defense."

While the fund for OGD may be increased by the Senate, it is not expected any substantial sum will be added and plans for staffing the agency will have to be drastically revised.

Over-all budget cut . . . The sharp knife which the committee used on the OGD appropriation was applied right through the Interior Department, for which it recommended an appropriation of $363,360,989 for fiscal 1955.

The recommended budget would be nearly $59,000,000 less than provided in the President's budget and $71,270,061 less than appropriated for the current year, which in turn was some $230,000,000 less than recommended for the year by former President Truman just before the Republican administration took over.

The committee admitted that in the "long-range view" much larger sums could be expended profitably for the development and conservation of our natural resources, but explained that "these lower figures are dictated in large measure by the urgent need for conserving dollars to improve the present federal Government fiscal position."

Department criticized . . . The committee, however, did find points on which it criticized the department severely.

One was the excessive volume of press releases, miscellaneous statistical data, and other information about its progress and personnel put out by the department—particularly by the Bureau of Mines—and funds for information purposes were sharply reduced.

On the other hand, the committee agreed with the Geological Survey that it is unsatisfactory to have its activities scattered among 16 different buildings in Washington, some of them unsafe for housing valuable maps and equipment.

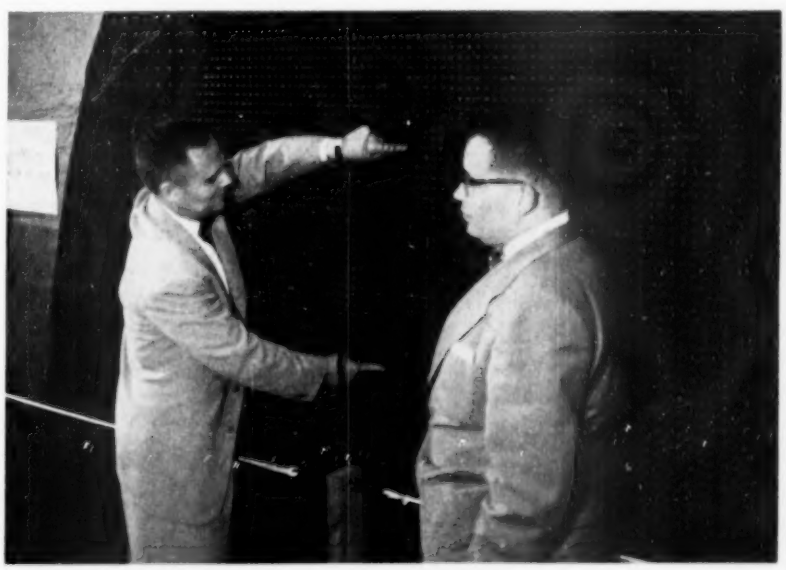
The committee authorized the preparation of plans and specifications for a new building to meet the needs of the Geological Survey. The building would be constructed if Congress enacts pending legislation to permit the application of rentals to the purchase of buildings erected by private enterprise.

Other reductions . . . The committee allowed only $125,000 for enforcement of the Connally Hot Oil Act, a reduction of $25,000 from both the current appropriation and the budget recommendations of the Interior Department.

The committee said efficient use of personnel should permit continuation of an effective enforcement program for the Hot Oil Act.

The Bureau of Land Management was allowed $11,483,000, the same as for the current year but $142,000 less than had been asked.

The Geological Survey's appropria-



Electric Model Simulates Reservoir Fluids

Research personnel at Magnolia Petroleum Co.'s field research laboratories at Dallas use this electrical model of an oil field to study reservoir behavior. Electric current obeys the same basic laws of flow as do fluids flowing through porous rock. By tracing the flow of the electricity in the model, Magnolia estimates how much oil the reservoir will produce and whether injection of gas or water will increase production. The surface of the model is studded with thousands of connections which carry electric current in and out.

tion recommendation was $25,362,685, a cut of $2,387,315 from current appropriations and $1,972,315 less than was asked.

The committee cut $554,215 from the Bureau of Mines' estimates for its oil and gas work and about $1,000,000 from its estimate for the present year. The oil and gas budget asked was cut from $1,250,000 to $909,585, and the synthetic fuels budget was cut from $4,099,000 to $3,885,200. The helium operations budget of $90,000 was allowed without change.

FPC Power Pondered

Supreme Court arguments seek to pinpoint limit of FPC authority over production and gathering of natural gas

WASHINGTON.—Argument over the point where production and gathering of natural gas ceases and Federal Power Commission authority over its interstate transmission begins was heard by the Supreme Court last week.

The regulatory status of some 2,200 natural-gas producers hinges on the court's action regarding last year's Court of Appeals decision that Phillips Petroleum Co. sales to interstate pipelines at natural-gasoline plants are subject to FPC regulation.

The lower court's decision reversed a 1951 ruling by the commission that it did not have authority to regulate gas until it entered an interstate pipeline. Both the company and the commission appealed to the Supreme Court. The court first refused to review the case and then reversed itself so that the issue could be thrashed out.

Some in the industry see a hint of the position the high court will take in its February opinion invalidating the Texas gas-gathering tax applied to sales of gas at the outlet of gasoline plants. In that case the court held that production and processing have ceased and transmission in interstate commerce has begun at that point and the gas passing out of the plant "is not only actually committed to but is moving in interstate commerce."

While the court may be able to agree on its opinion before the current term ends early in June, it is also possible that the final decision in the case may not be rendered until it convenes for its 1954-55 term next October.

How it all started . . . The issue of power commission control over the production and gathering of natural gas, and the point where those processes end, has a long history.

Enacting the Natural Gas Act, Congress provided for the exemption of processing and gathering but failed to establish specifically the point that natural gas entered interstate commerce and thus became susceptible to FPC authority.

In subsequent years the commission became involved in a number of controversies over where its authority began and the matter also was investigated by congressional committees. Legislation more clearly spelling out the exemption was passed by Congress in 1950 but was vetoed by former President Truman.

The matter finally got into the courts when the commission, in 1951, ruled it did not have authority to regulate gas until it entered an interstate pipeline. The state of Wisconsin and several cities where gas originally secured from Phillips is distributed filed suit to contest the commission's ruling.

Court's ruling . . . The Court of Appeals ruled the fact that Phillips gathers natural gas, buying some from other producers, and sells it to interstate pipelines brings it under commission control.

Appealing to the Supreme Court the company contended that Phillips' movement of gas and its sales for resale in interstate commerce, together with its processing operations, all constitute a part of its gathering business or are incidents or activities related to it, so that the movement, processing and sales come within the exemption provided in the law.

Joining with Phillips in the appeal were the three states in which it operates as a natural-gas gatherer. The states contended that extension of FPC control would jeopardize the expansion of natural-gas supplies and their conservation programs and ultimately would have a serious effect on the interests of consumers.

Tideland Battle Brews

Senate group led by Paul Douglas introduces resolution to repeal federal act of 1953 giving up offshore lands

WASHINGTON.—A new drive to take tidelands away from the coastal states and give their oil and other resources to the federal Government has been launched in Congress by a group of 14 senators headed by Sen. Paul H. Douglas of Illinois.

A joint resolution to repeal the Submerged Lands Act of 1953, was introduced by the group April 1.

Joining with Douglas in sponsoring the legislation were Sens. Green and Pastore of Rhode Island, Gillette of Iowa, Kefauver of Tennessee, Kilgore of West Virginia, Kennedy of Massachusetts, Lehman of New York, Fulbright of Arkansas, Murray of Montana, Morse of Oregon, Wiley of Wisconsin, Mansfield of Montana and Hennings of Missouri.

Basis of the attack is a provision exempting from the transfer of the lands to the states "all of lands acquired by the United States by eminent domain proceedings, purchase, cession, gift or otherwise in a proprietary capacity."

Political issue . . . Douglas criticizes the recent Supreme Court ruling for its failure to go into the merits of the constitutional and other legal questions which Rhode Island and Alabama sought to raise but, he says, "the court in effect ruled again, and even more clearly than before, that these offshore lands below low watermark were the property of the United States, not of the coastal states."

"This makes it crystal clear that what was attempted in the offshore oil bill was, in fact, a giveaway of vast federal resources."

By adding a provision that the revenues from the area shall be used for education with repeal of the law, Douglas made the question a political issue for the coming congressional campaigns.

He practically admitted that this was the whole purpose of the move, declaring "perhaps it will require another mandate of the people in an election before the administration and Congress are willing to do their plain duty in this matter."

Operators warned . . . Douglas also served notice on oil and gas operators that "any claims or interests they may acquire (in the submerged lands) are subject to being upset by the action of Congress now that the court has reiterated and clarified the federal proprietary right and taken away one of the principal grounds of the proponents for the give-away act."

Under the terms of the joint resolution "the provisions of the Outer Continental Shelf Lands Act are hereby made applicable to the submerged lands under the marginal seas as if such lands were a part of the outer Continental Shelf, as defined in such act, any provision in the Submerged Lands Act to the contrary notwithstanding, and any provisions in the Submerged Lands Act to the contrary are hereby repealed."

Hallanan Selects Committees

WASHINGTON. — Walter S. Hallanan, chairman of the National Petroleum Council, has appointed committees which will make studies requested last month by the Interior Department.

Dr. Robert E. Wilson, Standard Oil Co. (Ind.), heads a 23-man committee which will draft proposals or plans for organization to reduce and overcome effects of wartime attack on oil and gas facilities.

A 13-man committee, headed by F. W. Littell of Shell Pipe Line Corp., will bring up to date the council's 1953 report on use of radar and radio by the oil and gas industries.

L. S. Wescoat, president of Pure Oil Co., will head an 18-man committee to bring up to date a council report of December 1952 on petroleum storage and make a separate survey of underground storage capacity by types of storage and kinds and volume of products stored.

Tanker Review in Court

WASHINGTON. — The Supreme Court last week agreed to review the conditions under which surplus government vessels were sold following the last war, with possible effect upon the Justice Department's recent seizure of nearly 50 tankers and cargo ships on the ground they were illegally transferred to alien ownership.

The case before the court involves the tanker Meacham, which a federal court in Richmond, Va., ordered forfeited to the government on the ground it had been transferred to Chinese aliens by United States citizens who purchased it solely for that purpose.

WATCHING WASHINGTON

Bertram F. Linz

Fee Deferment Asked

Plans of the Federal Power Commission to impose fees for the filing of applications and the granting of authorizations under the Natural Gas Act may be deferred for at least 15 months.

The Senate commerce committee has adopted a resolution requesting the FPC and other agencies under its jurisdiction to postpone the adoption of a fee system until July 1, 1955 so that it can study the matter with the idea of having Congress set up basic standards for each agency to follow.

A provision in the Independent Offices Appropriation Act of 1952 directed the commission and other agencies to prescribe and collect fees designed to make the work of issuing certificates self-supporting. The FPC's proposed schedule, would raise approximately $500,000 a year.

The matter came before the Senate committee in the form of complaints that the schedule proposed by one agency was far out of line with the services rendered. A survey showed there was great disparity in the fees proposed by various agencies.

The FPC proposed a sliding scale of fees on applications for new facilities, starting at $150 for projects to cost less than $500,000. Projects costing more than $4,000,000 would call for a fee of $500 plus $100 for each additional $1,000,000 or fraction thereof. In addition, upon the granting of a certificate, the commission would levy an assessment in an amount not to exceed 0.1 per cent of the estimated cost of the certificated facilities.

In the case of a project costing $100,000,000—and El Paso Natural Gas Co.'s Permian Basin-Kingman, Ariz., line was authorized for $175,000,000—the fees could run to more than $110,000. Had the fees been in effect the cost to El Paso might have been some $192,000.

New Method Bogs Down

Antitrust complaints filed with the Department of Justice have increased more than 45 per cent since the Eisenhower administration took office.

With appropriations steadily reduced since 1950, the department is in a jam. For this reason it is pressing the idea of consent settlements before civil suits are filed to save both the government and defendants time and money.

However, Assistant Attorney General Stanley N. Barnes, head of the antitrust division admits the idea of allowing defendants to negotiate a settlement so that a consent decree can be filed simultaneously with a complaint, thus short-circuiting court proceedings, isn't meeting with too much success.

Attempts to negotiate advance consent decrees have been made in 17 cases. Eight have definitely proved unsuccessful and suits have been or will be filed. Only three suits have been settled and four others are still in negotiation with some promise of success.

Apparently industry is not opposed to consent-decree settlements but merely to settlements before the full strength of the government's hand is indicated formally in court.

Storage Presents Problems

Members of Congress are trying to resolve differences between the natural gas and mining industries over underground storage of gas.

The Senate commerce committee has before it a bill to permit gas companies to condemn properties suitable for underground storage, under authorization from the Federal Power Commission.

The measure has been supported in hearings before the committee by spokesmen for the gas industry. The other industries, while not opposing the legislation in its entirety, have attacked it as creating a hazard of gas seepage from storage reservoirs into mines. They are demanding that it be amended to protect the health and safety of miners.

Although power commission officials have stated that the safety of adjacent underground operations would be a factor in considering applications for underground storage, the mining industries have indicated they will be content with nothing less than a congressional formula insuring protection.

The committee is trying to work out provisions which will deal with the matter to the satisfaction of both sides.

Refining Session Set

A.P.I. refining division schedules 12 technical sessions for its midyear meeting in Houston May 10 through May 13

HOUSTON.—Petrochemicals, preignition, and processes will highlight the nineteenth midyear meeting of the American Petroleum Institute's Division of Refining at the Rice Hotel here, May 10-13.

Twelve technical sessions will cover other refining subjects including analytical research, corrosion, training, maintenance, waste disposal, fractionation, and the failures of oil storage tanks.

The session on tank failures will be the first devoted to this subject since the occurrence of some rather spectacular breaks in storage tanks in recent years. Included will be a report of the study group on oil storage tank failures on results of a survey conducted on the subject.

Other related papers will concern the brittle failure of steel structures, the economic aspects of the problem, and the study of tank failures by Standard Oil Development Co.

The motor fuels session will be devoted largely to preignition, with papers by General Motors, du Pont, Atlantic, and Ethyl Corp. authors. Among the petrochemicals marked for special attention in a separate session are isobutylene by the sulfuric acid process, benzene and toluene extraction by sulfur dioxide, and ethylene.

Among papers of particular interest to be presented at the meeting are the following:

May 10

Corrosion . . . "Corrosion and Prevention—Heat Exchangers in Cooling Water Service," J. D. Munro, Standard Oil Development Co., Linden, N. J.; "Selection of Paints and Application in Combating Atmospheric Corrosion," F. T. Radecke, Shell Oil Co., Wood River, Ill.; "Hydrogen Chloride Evolution From Crude Oils as a Function of Salt Concentration," G. J. Samuelson, Petrolite Corp., St. Louis, Mo.

May 11

Refinery maintenance . . . "Minimizing the Refinery Maintenance Crew," F. C. King, General Petroleum Corp., Los Angeles, Calif.; "The Use of Technically Trained Men in Refinery Maintenance Work," D. G. Debo and J. G. Houseman, Standard Oil Co. (Ind.), Whiting, Ind.; "A Correlation of Manpower Requirements, Maintenance Requirements, and Equipment Selection," J. S. Dalton and M. A. Pappas, Standard Oil Co. (Ohio), Cleveland, Ohio; "Effective Control of Storehouse Operations," J. H. Anderson, Humble Oil & Refining Co., Houston, Tex.; "Area Supervisor System as Applied to Baton Rouge Refinery," O. R. Minton, Esso Standard Oil Co., Baton Rouge, La.; Panel session on "Planning for Major Unit Turnarounds" with C. H. Trotter, Phillips Petroleum Co., Bartlesville, Okla.; E. C. Newton, Atlantic Refining Co., Philadelphia, Pa.; J. T. Tippit, The Texas Co., Port Arthur, Tex.; and A. C. Collins, Shell Oil Co., Wood River, Ill.

Oil storage tank failures . . . "Brittle Failure of Steel Structures—A General Engineering Problem," Prof. M. E. Shank, Massachusetts Institute of Technology, Cambridge, Mass.; "Results of the Survey of Study Group on Oil Storage Tank Failures," by members of the study group headed by C. H. Samans, Standard Oil Co. (Ind.), Whiting, Ind.; "Some Economic Aspects of the Oil Storage Tank Failure Problem," F. A. Gitzendanner, Standard Oil Co. (Ind.), Whiting, Ind.; "The Standard Oil Development Co. Study of Brittle Failure of Tank Steels," F. J. Feely, Jr., and M. S. Northup, Standard Oil Development Co., Linden, N. J.

May 12

Waste disposal . . . "Chemical Flocculation of Refinery Wastes," R. F. Weston, Atlantic Refining Co., Philadelphia, Pa.; "Planning and Execution of an Oil Refinery Waste Survey," A. P. Dennis, Jr., Bayway refinery, Esso Standard Oil Co., Bayway, N. J.; "New Oil Reclamation and Waste Disposal Facilities," J. F. O'Reilly, Skelly Oil Co., El Dorado, Kans.; "Preferential Withdrawal of Catalyst Fines to Reduce FCC Stack Losses," D. L. Cleveland, Shell Oil Co., Wilmington, Calif.; "Catalytic Combustion of Refinery Waste Gases," David B. Ardern, Houdry Process Corp., Philadelphia, Pa.; "Status Report on Research Program of the Smoke and Fumes Committee," Vance N. Jenkins, Union Oil Co. of California, Los Angeles, Calif.

Motor fuels . . . "The Contribution of Surface Combustion of the Fuel to Preignition," R. E. Wilson, F. W. Bowditch, and G. J. Nebel, General Motors Research Laboratories, Detroit, Mich.; "The Preignition Resistance of Fuels," B. M. Sturgis, E. N. Cantwell, W. E. Morris, and D. L. Schultz, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; "The Selection of Fuel Additives to Reduce Preignition," F. C. Burk, L. J. Test, and H. R. Jackson, Atlantic Refining Co., Philadelphia, Pa.; "The Measurement and Chemical Control of Preignition in Engines," J. S. Wintringham, J. B. Hincamp, and H. A. Toulmin, Ethyl Corp., Detroit, Mich.

Petrochemicals . . . "Petrochemicals—Glamour Girl or Problem Child," G. B. Ryan, V. A. Brietenbach, Standard Oil Co. (Ohio), Cleveland, Ohio; and H. K. Nieuwenhius, consultant, New York; "Isobutylene Manufacture Using Sulfuric Acid Process," G. P. Baumann and M. R. Smith, Standard Oil Development Co., Linden, N. J.; "Simultaneous Extraction of Benzene and Toluene by the Sulfur Dioxide Process," Strobel and Kolar, Continental Oil Co., Houston, Tex.; "Large-Scale Manufacture and Distribution of Ethylene," J. W. Cornell, W. H. Litchfield, and H. M. Vaughan, Gulf Oil Corp., Pittsburgh, Pa.

May 13

Processes . . . "Dualayer Refining of Distillate Fuel Oils," C. A. Duval, R. T. Malin, and V. A. Kalichevsky, Magnolia Petroleum Co., Beaumont, Tex.; "Factors in Selecting a Catalytic Reforming Process," J. A. Boch, W. R. Hertwig, L. W. Bussum, and R. A. Steel, Standard Oil Co. (Ind.), Whiting, Ind.; "A Model II Fluid Hydroformer and Its Application," E. W. Nicholson, Esso Standard Oil Co., Baton Rouge, La.; "Hyperforming," Clyde Berg, Union Oil Co. of California, Wilmington, Calif.

Fractionation . . . "Fractionation Equipment Sizes for Refinery Feed Stocks," G. T. Atkins and G. W. Wilson, Humble Oil & Refining Co., Houston, Tex.; "Behavior of Binary and Ternary Mixtures During Continuous Distillation," M. R. Fenske, Pennsylvania State University State College, Pa., and Norman Kirk, General Electric Co., Schenectady, N. Y.; "The Performance of Catalytic Units Fractionating Towers," G. S. Houghland, E. J. Lemieux, and W. C. Schriener, M. W. Kellogg Co., Jersey City, N. J.; "Hydraulics of Tray Design," Prof. R. L. Huntingdon, University of Oklahoma, Norman, Okla.

T.P.R.C. Symposium Slated

TYLER, Tex.—A symposium on the "Deep Lime Fields of East Texas," sponsored by the Texas Petroleum Research Committee, will be held here May 7.

The symposium will include a dinner session at which Joe Zeppa of Delta Drilling Co., Tyler, will speak on "A Practical Operator's Views of Deep Lime Development in East Texas," and Gen. Ernest O. Thompson, chairman of the Texas Railroad Commission and member of the steering committee of T.P.R.C., will present the main address. Dr. G. H. Fancher is director of T.P.R.C.

Papers to be presented in the symposium and their authors are:

"General Subsurface Geology of Deep Lime (Glenrose) Oil Occurrence in Northeast Texas," R. W. Eaton, P. G. Lake, Inc., Tyler, and John L. Read, Jr., W. H. Bryant interests, Tyler; "Estimate of Primary Recovery From Some Typical Glenrose Fields in Northeast Texas," G. J. Lotterle, Tyler; "The Character of the Deep Limestone Crude Oils of East Texas," Paul Crawford, T.P.R.C. staff, College Station, Tex.; "Use of High Pressure Gas to Increase Oil Recovery," E. R. Brownscombe, Atlantic Refining Co., Dallas; "Pressure Maintenance by Gas Injection in the Opelika Field of Henderson County," T. W. Clay, Dallas; "The New Hope Field of Franklin County," Albert Trube, Tide Water Associated Oil Co., Houston; "Tennessee Colony Field of Anderson County," Frank N. Speller, Jr., consultant, Tyler; "The Banker's Viewpoint," B. F. Barnett, president, Citizents National Bank of Tyler; "Application of MicroLogs to the Lower Glenrose of East Texas," R. T. Wade, Schlumberger Oil Well Surveying Corp., Shreveport; and "Advances in Acid Treatment of Deep Limestone Wells in East Texas," Paul S. Clinkenbeard, Dowell Incorporated, Shreveport.

I.P.A.A. Session Scheduled

DENVER.—The 2-day silver anniversary meeting of the Independent Petroleum Association of America will open here May 3.

The first business session the morning of May 3 will include an address by Gov. Dan Thornton of Colorado, followed by a report from W. M. Vaughey, Jackson, Miss., I.P.A.A. president.

The national executive committee and state and area vice presidents will meet May 2, prior to the opening day. Other committees scheduled to meet in advance of the general sessions are supply and demand, cost study, productive capacity, natural gas, import policy and secondary recovery and stripper well committee.

A.P.I. Division to Meet

LOS ANGELES.—The spring meeting of the American Petroleum Institute's Pacific Coast division of production will be held in the Statler Hotel here May 6-7, according to C. F. Gates of General Petroleum Corp., general chairman for the meeting.

The 2-day meeting will include presentation of 10 papers and a panel discussion entitled "Primary Cementing of Water Strings in California." Addresses of general interest will be made by J. R. Suman, Standard Oil Co. (N.J.), and Raymond G. Moley, feature writer for Newsweek.

GULF COAST

Bid Sets Record

Humble offers 90.5 per cent royalty to get Texas lease

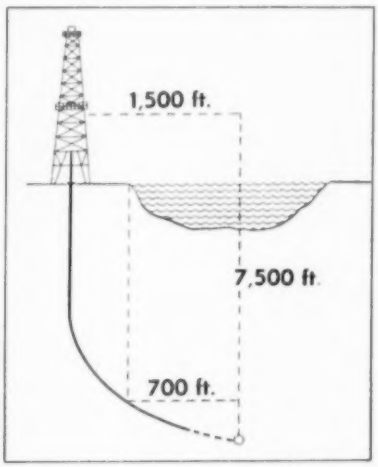
HOUSTON.—Humble Oil & Refining Co. here has acquired a choice 65-acre tract in an area of proven production in Neches field for what may well be the highest royalty offer ever made in the history of the oil industry.

The firm offered the State of Texas a royalty of 90.5 per cent of gross oil production from the tract, which lies in Anderson and Cherokee counties, East Texas. Humble points out that Neches field is the most important oil-field discovery made by the firm during 1953.

A number of other companies were seeking this 65-acre tract during the sale of school lands in Austin last week. Forty-three companies bid on the tract, and 38 of the offers exceeded a 50 per cent royalty. Second highest offer was 81.31 per cent, by H. E. Rambo, an independent operator.

Bascom Giles, chairman of the State Land Board and commissioner of the General Land Office, said that the offer was so fantastic that he had never heard of another bid anywhere in the world that could even approach it.

The offer means that out of every 100 bbl. of oil produced from the tract, 90.5 bbl. will go to the state. The field produces from the Woodbine sand.



Mississippi Gamble

Carter whipstocking well 700 ft. under main channel

SHREVEPORT.—Carter Oil Co. is near its objective formation on a wildcat being whipstocked under the main channel of the Mississippi River.

The well is being drilled on the Louisiana bank of the river, 25 miles south of Natchez, Miss., on the opposite bank. It will be bottomed at 7,500 ft. The well will be curved 1,500 ft. east of the rig and will extend 700 ft. under the channel.

Justiss-Mears Drilling Co. is contractor and last week was below 6,880 ft. at a point 1,448 ft. east of the rig. The first whipstock was set at 1,339 ft.

The lease was sold to Carter by the State of Louisiana, which will receive a one-eighth royalty if the well is a producer.

New Operator at Old Ocean

HOUSTON.—Stanolind Oil & Gas Co. will become operator of the unitized Old Ocean oil field in Brazoria County, Texas, May 1. Stanolind also will become unit operator of a large gasoline and gas-injection plant with a capacity rated at 35,000,000 cu. ft. per day.

Stanolind takes over from the J. S. Abercrombie Co., which is being dissolved. The Abercrombie company has been operator in the field since it was unitized in 1946, but sold its interests several years ago to Old Ocean Oil Co.

Old Ocean field, covering 18,600 acres with about 250 producing wells, was discovered in 1934 by Jim Abercrombie and Dan Harrison.

In addition to Stanolind, Magnolia Petroleum Co. and Tide Water Associated Oil Co. have major interests in the field.

Second Deal Made

Melben, Ohio, and Pure join in offshore exploration work

HOUSTON.—The second deal within 10 days by a group of oil companies for a joint exploration venture in the Gulf of Mexico has been disclosed here.

Melben Oil Co., Ohio Oil Co., and Pure Oil Co. have joined efforts for drilling of a 28,640-acre block about 10 miles off the coast of Galveston Island. Pure, owner of one-half interest in the acreage, has been named operator.

The initial test is to be spudded in directly opposite the city of Galveston.

A drilling platform and related equipment are to be used and fabrication of this equipment is expected to get under way shortly.

Sinclair group . . . Recently Sinclair Oil & Gas Co. was named operator of another group organized for exploration, leasing, and drilling in submerged areas off the coasts of Louisiana and Texas. This agreement was reached by Sinclair, Sohio Petroleum Co., El Paso Natural Gas Co., and Peoples Production Co., subsidiary of Peoples Gas, Light & Coke Co. of Chicago *(The Oil and Gas Journal, April 5, page 63).*

Unlike the group formed here, the Sinclair group does not hold any offshore leases at present.

Fracturing Paying Off

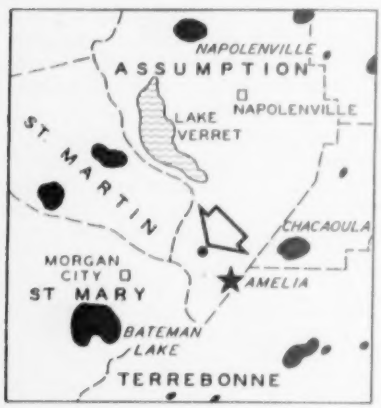
SHREVEPORT. — Formation fracturing of the Annona chalk in old Caddo-Pine Island field in Caddo Parish is paying off.

The week of April 1 saw a total of 17 new locations made in the area. There were 29 oil wells completed in the same period. Nearly all of the wells being drilled in the old area are fractured. This means of completion has boosted production in the field and is the main reason for the surge in activity

in this section of northwestern Louisiana.

The new activity is attracting independent operators at an ever-increasing rate. The most active majors are Stanolind Oil & Gas Co., Magnolia Petroleum Co., and The Texas Co. These three operators have kept up a consistent drilling program in the old shallow field. The Texas Co. alone finaled three wells in 1 week, good for 110 bbl. of oil per day.

Most of the wells are completed at about 1,650 ft. Few dry holes have been reported in the current program. Initial potentials average about 35 bbl. of oil per day per well. Since the first of this year operators have completed 290 oil wells in Caddo Parish, the greater number being added to Caddo-Pine Island field production.



New Field Opened

Union Oil discovery opens major South Louisiana field

MORGAN CITY, La.—What appears to be a field of major importance for South Louisiana was opened last week by Union Oil Co. of California in East Lake Palourde area, 7 miles northeast of here in southern Assumption Parish.

The discovery well, 1 Williams, completed in Miocene sand at 13,385-97 ft. after drilling to 14,991 ft., flowed initially at the rate of 250 bbl. of 39.2°-gravity oil per day through ⅛-in. choke with pressure of 2,600 psi.

Location, in 30-15s-14e, is on a block of 6,200 acres held by Union Oil Co. It is 2 miles northwest of a 14,200-ft. gas-condensate producer completed last December by M. L. Mayfield as the discovery well of Amelia field. Nearest oil-producing field is at Chacahoula, 6 miles east.

Union already is nearing the pay zone of its discovery well in another test, 2 Williams, a location northeast of the first producer.

Magnolia Asks Extension

NEW ORLEANS.—Magnolia Petroleum Co., Dallas, has applied for revival and extension of the time limit for 3 years to complete installation and maintenance of drilling equipment in certain areas offshore in the Gulf of Mexico.

Magnolia plans to drill two wells off Cameron Parish, one about 20 miles southeast of the town of Cameron, and the other about 36 miles southeast of Cameron. The company will install and maintain drilling platforms in both these areas.

Gulf Operation Planned

HOUSTON. — British-American Oil Producing Co. here plans to conduct seismograph operations in the Gulf of Mexico, in an area along the Texas coast off Jefferson County.

The area will extend into the Gulf from shoreline a maximum of 16 nautical miles. Suspended charges of explosives will be detonated below the surface and recordings made. The company will install no obstructions in the waterway, according to its application to the U. S. Army Engineers for permit to do the work.

British-American plans to get the program under way late in April.

CANADA

Lube Plant Planned

Imperial Oil to install first Hydrofinishing unit

EDMONTON, Alta.—Imperial Oil, Ltd., has awarded a contract to Canadian Kellogg Co. for the major portion of a $14,000,000 lube-oil plant at its 27,750-bbl. refinery here.

The 2,000-bbl. per day lube-oil plant, to be the first west of Sarnia, Ont., and the second largest in Canada, will be the world's first commercial installation employing the Hydrofinishing process.

Besides the lube plant, other facilities to be built include a 2,000-bbl. catalytic reformer, a phenol treating unit, a ketone dewaxing unit, and a packaging plant and warehouse.

Work is expected to begin this summer with completion scheduled for late 1955. Engineering and design work was done by Imperial's engineering division at Sarnia.

Hydrofinishing involves passing hydrogen through the lubricant in its last stages of manufacture to remove impurities and to improve the lubricating qualities of the oil. It replaces clay treating.

Charge for the lube oil plant will come from the vacuum distillation unit in the refinery. It will be treated in the phenol plant and ketone dewaxing unit before Hydrofinishing and final blending to specifications.

Hydrogen used in the process will come from the catalytic reformer.

The packaging plant will contain the filling equipment capable of handling 400 quart cans per minute and 45-gal. drums at a rate of more than one per minute.

Hydrogenation has been used previously in the treatment of some other petroleum products, but the Hydrofinishing process is its first application in the making of lube oils.

Imperial's refinery was moved here in 1948 from Whitehorse. Its initial production was 6,000 bbl. daily. In 1952, a catalytic cracker and a vacuum distillation unit were added.

Lake Exploration Slated

WINDSOR, Ont.—The Ontario Government has granted a 3-year exploration permit covering 86,000 acres of the bed of Lake St. Clair to a Toronto syndicate represented by C. G. Huston, mining engineer.

The acreage extends 5 miles from the Canadian shore, 32 miles east and north of Windsor, and to the south opposite Riverside, Tecumseh, Puce, Belle River, and Stoney Point. Annual rental for the acreage is $21,900.

Work will be started about May 1, with a preliminary gravimeter survey conducted from a tug. The area west and north of the old Kent and Essex gas and oil fields will be tested. Sharp Brothers of Toronto has the contract for the geophysical survey.

Drilling in the lake bed will be the second underwater drilling operation in Ontario. The only previous operations of that type were in Lake Erie.

ROCKY MOUNTAIN

Drilling Activity High

DENVER.—A new Rocky Mountain drilling record was set in the first quarter of this year.

Well completions in the area were at the highest level in history. More than 900 wells were completed during the first 3 months, compared to 642 in 1953, an increase of 45 per cent. Development drilling was up 54 per cent and wildcat drilling up 26 per cent.

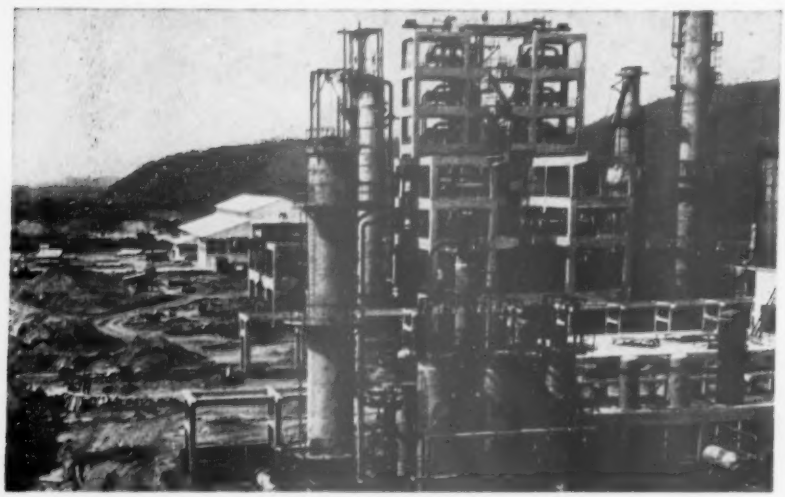
If it Looks Like This Drum:

You'll get DRY OIL

...in every Tank...every Time

VISCO PRODUCTS COMPANY
INCORPORATED
2600 Nottingham at Kirby
Houston 5, Texas

Visco® ... CONSISTENTLY EFFICIENT DEHYDRATING AND DESALTING CHEMICALS



RECOVERY UNIT of the partially completed Cubatao refinery near Sao Paulo.

Crude Supply Secured

Esso Export and California Transport contract long-term crude supply for nearly completed Brazilian refineries

PRODUCT needs of the fast-growing Sao Paulo region in Brazil will be met from domestically refined supplies after completion of two new refineries with an aggregate capacity of 65,000 bbl. daily.

One of the refineries is the government-owned, 45,000-bbl. daily Cubatao plant near Santos. It is scheduled to be finished late this year after some 5 years of construction work. The other is the privately owned 20,000-bbl. daily Capuava refinery situated on the outskirts of Sao Paulo. It will go in operation before the end of the year.

Successful bidders . . . Two major American companies will supply the crude for the Cubatao refinery. It was announced April 1 in Rio de Janeiro that Esso Export Corp. (Standard Oil Co., N. J.) would provide 30,000 bbl. daily, and that California Transport Corp. (Standard Oil Co. of California) would furnish the remaining 15,000 bbl. daily.

The government's National Petroleum Council designated these companies as the successful bidders after a month's study of the nine offers received in response to its earlier invitation. The crude-supply contracts, running 5 years, represented the major piece of business offered recently in world oil markets.

Prices which the refinery will pay for the crude were not specified in the announcement. Bids had been submitted by nine companies, including, also, Atlantic Refining Co., Socony-Vacuum Overseas Co., Anglo-Iranian Oil Co., The Texas Co., Shell Petroleum Co., Shell of Venezuela, and Gulf Export.

Esso will meet its contract with Venezuelan crude from Tia Juana field. Standard of California, it is reported, will deliver crude oil from Saudi Arabia. The supply of crude to Cubatao also involves the use of foreign tankers. Brazilian-flag tankers total 247,000 d.w. tons, including 225,000 in the Frota Nacional de Petroleo, but some of these are coastal vessels, and only 12 ships are available for overseas crude hauls.

Cubatao refinery . . . The Cubatao refinery is situated northeast of Santos at the foot of the escarpment lying a short distance back from the coastline. A 22-in. pipe line is being laid 8 miles from the 235-acre refinery site to the Santos docks through which the imported crude for the plant will be received.

Facilities at the Cubatao refinery include crude unit, visbreaker, naphtha recovery, treating, catalytic polymerization, an Edeleanu unit, a hydrocodimer for aviation gasoline providing use of a codimer for catalytic polymerization. The refinery was designed and engineered by Hydrocarbon Research, Inc., with construction by Arthur G. McKee & Co. It is a project of the Conselho Nacional do Petroleo, former government oil organization whose assets were recently transferred to the national Brazilian oil enterprise, Petroleo Brasileiro, S. A. (Petrobras).

The Cubatao refinery cost approximately $50,000,000, including housing and some other associated facilities. About $7,500,000 was spent in the United States, and another $13,000,000 in Europe. The heavy equipment, including towers, exchangers, drums, and products tanks, were obtained in France from Cie. de Fives-Lille pour Constructions Mecaniques et Enterprises, and Schneider et Cie. The thermoelectric plant and some of the boilers were bought in Germany from the Siemens company. Looking toward the anticipated August completion, the last major item for the plant, the control panels, were shipped from the United States.

The line of products produced at Cubatao will be marketed by existing companies in Sao Paulo and the adjoining region. Sao Paulo, with a population of some 2,500,000, is the industrial capital of Brazil, and the area takes a substantial part in Brazil's rapidly mounting oil consumption, estimated last year at 145,000 bbl. daily.

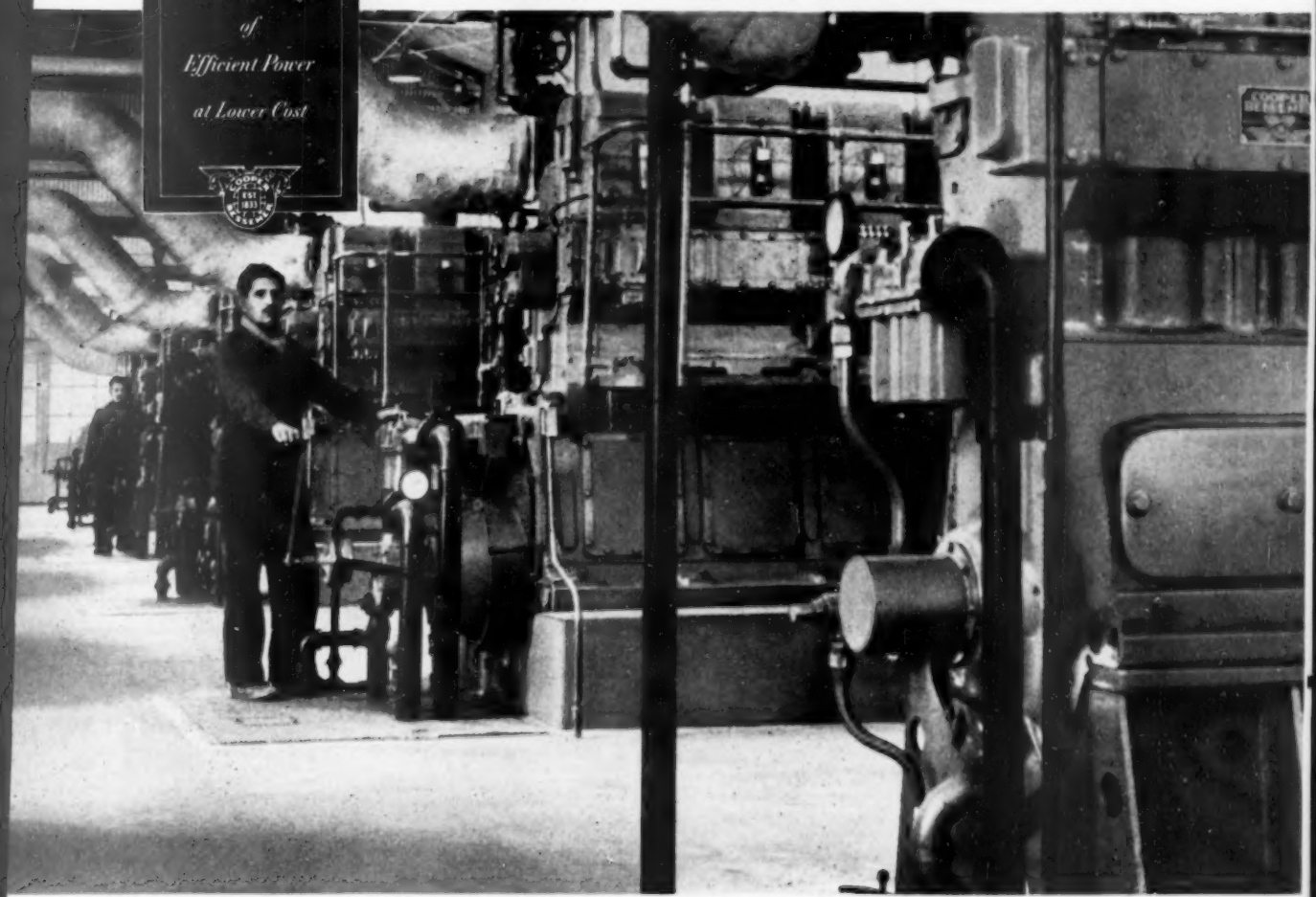
Capuava refinery . . . The Capuava refinery, 20 miles west of Sao Paulo, is owned by Refineria e Exploracao de Petroleo "Uniao," S. A., a private Brazilian company having around 11,000 Brazilian stockholders. President and principal shareholder is Dr. Alberto Sampaio, a Brazilian industrialist. Construction as well as design and engineering of the refinery is by Hydrocarbon Research.

Last year's law creating Petrobras leaves privately owned refineries outside the government monopoly provided they are in operation by the time originally set in the refinery concession, or for Unaio, the end of 1954. The Petrobras law prohibits private refineries from expanding their capacity, and allows Petrobras to buy into the companies later for the purpose of transforming them into subsidiaries.

The Capuava refinery is designed for maximum production of motor gasoline. Besides the crude unit, facilities consist of one of the largest T.C.C. units with a 12,000-lb. per hour coke burning capacity, recovery unit, catalytic polymerization, and treating. It will provide about 12,000 bbl. daily

Another Example of Efficient Power at Lower Cost

Cooper-Bessemer 675 bhp JS-8 spark-ignited gas engines driving centrifugal pumps in the gathering center at the Kuwait oil fields.



COOPER-BESSEMERS-- AT KUWAIT

BECAUSE of its rich oil fields, the small Arab Sheikhdom of Kuwait at the head of the Persian Gulf, has recently gained world-wide importance.

Cooper-Bessemer JS-8 gas engines were chosen to power the original field pumping units at Kuwait which transfer the crude oil to the shipping tanks at Ahmadi. Additional Cooper-Bessemer Gas-Diesel engines drive generators for lighting and for powering the gathering centers' electrically driven auxiliaries.

In this desert area where shade temperatures rise to 120°F during the summer season, reliable, trouble-free power is a prime necessity. That is why Cooper-Bessemers were chosen for the job.

Full gas operation, oil, Gas-Diesel, or quick conversion . . . you will find Cooper-Bessemer units of the size and type you need, ready to give top performance and unmatched economy.

MOUNT VERNON, OHIO

COOPER-BESSEMER

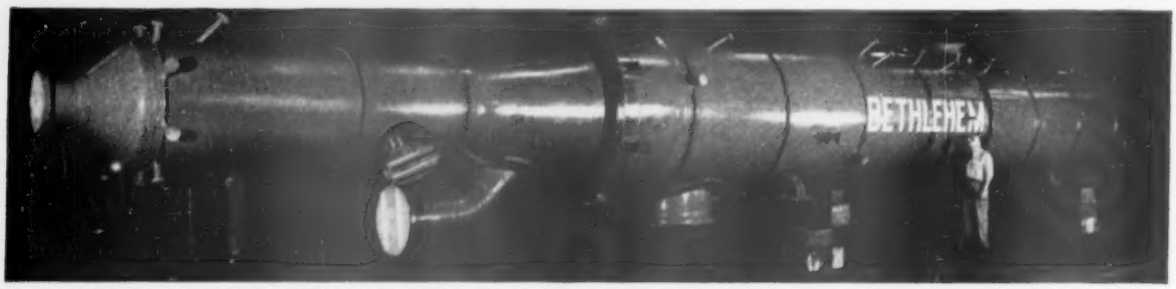
GROVE CITY, PENNA.

New York City Washington, D. C. Bradford, Pa. San Francisco
Houston, Dallas, Greggton, Pampa and Odessa, Texas Seattle, Wash.
Shreveport, La. St. Louis, Mo. Los Angeles, Calif. Gloucester, Mass.
Tulsa, Okla. New Orleans, La.

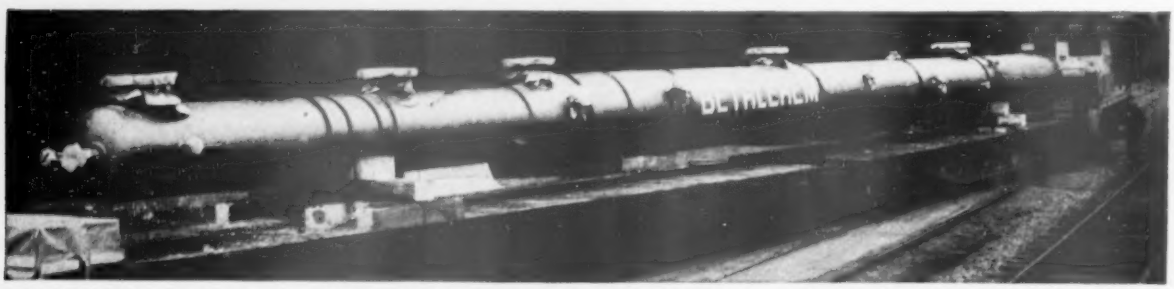
DIESELS • GAS ENGINES • GAS-DIESELS • ENGINE-DRIVEN AND MOTOR-DRIVEN COMPRESSORS • HIGH PRESSURE LIQUID PUMPS

Tall Towers Made By Welding

FRACTIONATING TOWER — This 82-ft tower for an oil refinery weighs about 31 tons and is 8 ft in diameter. Its shell is made up of ½-in. steel plate — welded carefully to meet the vessel code of API and ASME.



REACTOR TOWER — Welded of both 7/16-in. and 5/16-in. steel plate, this 76-ft vertical tower weighs about 24 tons. Within the shell are some rather complex "innards." It's built to API-ASME vessel code for an oil-refinery process.



BUBBLE TOWER — Slightly more than 95 ft long, this chemical process tower tips the scales at nearly 30 tons. Tested hydrostatically to 756 psi, it's made of welded plate in both 1 1/16-in. and 7/8-in. thicknesses.

These big towers are typical of the complex types of equipment that are fabricated by our Weldment Shop — not just for chemical and petroleum processes but for builders and users of all kinds of machinery.

Bases, frames, assemblies, vessels, presses, large-diameter pipe work, autoclaves, kilns, tanks — all of these are economically made by welding together steel plates of varying thicknesses. Steel forgings, castings or structural shapes are often incorporated.

Here are some good reasons for looking into Bethlehem Weldments:

ECONOMY — Excess weight is eliminated, but at no sacrifice of rigidity or strength. This reduction in weight usually means a real saving in the total cost of machines or assemblies.

FREEDOM OF DESIGN — There's absolute freedom of design because the steel plate can be bent, pressed or shaped prior to welding without affecting its physical structure. Either forgings, castings or structural shapes can be incorporated where desirable.

VERSATILITY — All sizes and shapes of steel can be welded together from blueprints. Weldments can be simple or complex parts, sections of assemblies, or finished machines.

★ ★ ★

Be sure to get our price the next time you need large machinery parts, frames or assemblies. You may be pleasantly surprised at the savings that are possible with weldments made in our well-equipped shops. Get in touch with the nearest Bethlehem sales office for full details.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM WELDMENTS

of gasoline, or 60 per cent of total crude charge, 6,000 bbl. daily fuel oil, and 2,200 bbl. daily of L.P.G. and butane.

The plant is designed to operate on Kuwait crude, and the Uniao company has a long-term supply contract with Gulf. With this crude, the refinery will produce a premium-grade gasoline with an octane in excess of 72 clear, somewhat higher than that now sold on the Sao Paulo market.

Crude oil for the plant will be delivered through a 12-in., 21-mile line extending down the escarpment to the Cubatao station where it connects with other lines leading to the port. The line is being built by the Santos-Jundiai Railroad which about 1½ years ago finished a 10 and 18-in. system from Santos to Sao Paulo for products. These existing lines now delivering imported products can be used to move supplies from the Cubatao plant to Sao Paulo after it goes on stream.

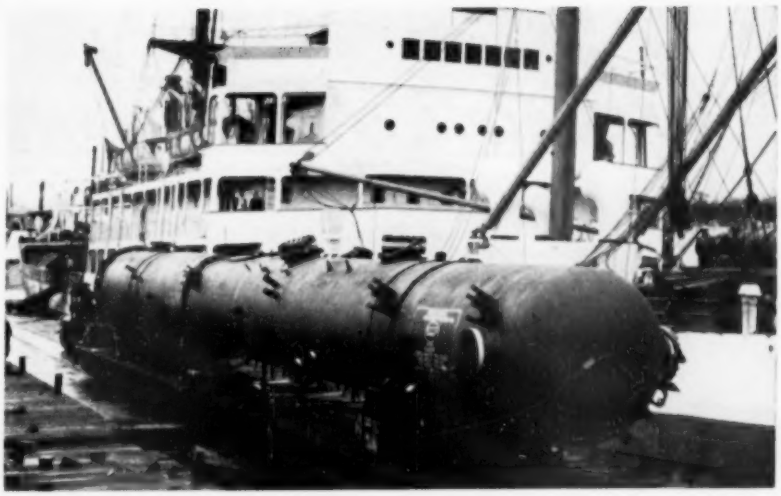
To meet the problem of fresh water, a 185,000,000-gal. reservoir has been provided by damning a natural depression on the refinery site. During the rainy season, water will be pumped into the reservoir from a creek cutting through the property. The refinery will generate its own power, using diesel engine-driven equipment. Work on the over-all project began the early part of 1953 with all major equipment items coming from the United States.

Sui Stock Oversubscribed

A public offering of $2,800,000 in stock in Sui Gas Transmission Co. was subscribed over six times when the lists were opened and closed recently in Karachi.

Pakistani investors were asked to put up the rupee equivalent of this amount of the equity capital of the company. Sui Gas Transmission is planning to lay a 350-mile, 16-in. line to move gas from Sui field to Karachi in West Pakistan. Most of the funds for the $25,200,000 project are coming from a World Bank loan, the Pakistan Government's Industrial Development Corp., and Burmah Oil Co., Ltd., whose subsidiary, Pakistan Petroleum, Ltd., made the gas discovery at Sui in 1952.

Contractors' bids for construction of the line are now being examined, and the award is expected to be announced soon. Meanwhile, Pakistan Petroleum disclosed that a derrick has been erected at the site of Sui 3 and that a location for No. 4 has been chosen. The latter well will be to the southeast of No. 1 and is intended to show the extent of the limestone across the structure to the south.



Platformer Column Begins Trip to Aden

This 96-ft. gas-treating column was loaded in Houston recently for shipment to Aden at the southern end of the Red Sea where Anglo-Iranian Oil Co., Ltd., is building a 120,000 bbl. daily refinery. The column, part of a Platformer unit, was manufactured by Wyatt Metal & Boiler Works. The refinery, the largest complete new plant now being built, is due to come into operation late this year.

New Field Open

Crude from Indian wildcat moving to Digboi refinery

ASSAM OIL CO., LTD., has placed its Nahorkatiya 1 discovery well in northeast India on regular production at a rate of about 500 bbl. daily.

The crude is being moved by rail tank cars to the company's refinery at Digboi about 20 miles to the northeast. An 8-in. oil line and a gas line are now being laid from Nahorkatiya to Digboi with completion due later this year.

The deep discovery at Nahorkatiya was taken to 11,715 ft. Drilling began in May 1952 and extensive tests were carried out last year. A second well located on the south bank of the Burhi Dihing River about a mile from the original discovery was started in December and was recently reported approaching its objective depth of 10,500 ft.

Locations for other wells in the new field have been made, and Nahorkatiya 3 is due to be started in a few months. A road was recently opened between the field and Digboi. The new pipelines are being laid along this road. The company also has stepped up its exploratory work in the Brahmaputra Valley. Gravity and seismic work is under way elsewhere in the Brahmaputra alluvial area, and an aerial magnetometer survey is being flown over a large area in Assam.

In Digboi itself, a gasoline plant was recently brought into operation for the production of natural gasoline from Digboi crude. A new lubricating-oil plant is under construction at the refinery, and in Digboi field drilling continues in selected locations in an effort to maintain production from this older field.

Exploration Pushed

Two more rigs headed for Western Australian play

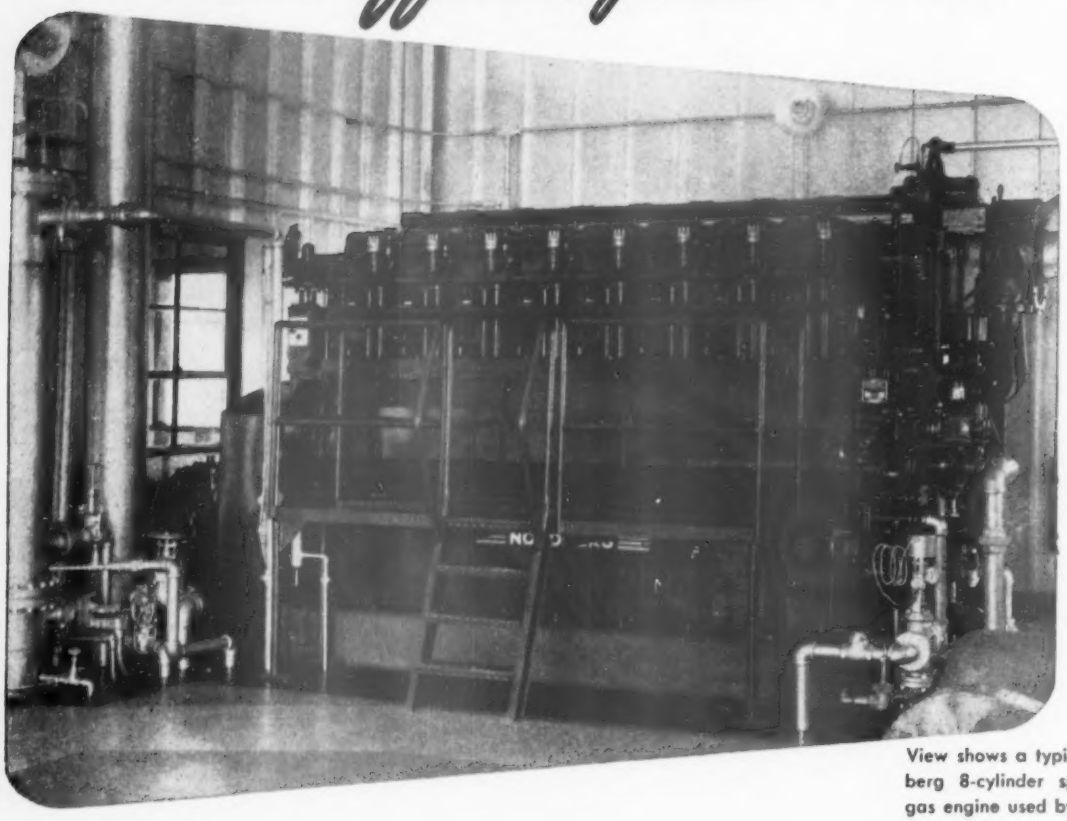
THE West Australian Petroleum, Pty., Ltd., has arranged for two additional drilling rigs to develop its Exmouth Gulf discovery and carry on further exploration elsewhere in Western Australia.

The company, which is controlled by Caltex, has bought the heavy rig owned by the Australian federal Government for the equivalent of about $850,000. The equipment will be used for a test in the Fitzroy basin in the northern part of Western Australia. The rig was originally bought by the government to stimulate oil exploration and is in storage in Melbourne. The price was $88,000 more than the government paid for the equipment.

West Australian Petroleum has loaded a medium-depth rig in California for shipment to Australia and is planning to add still another rig of this type to the program later this year. Brown Drilling Co., Long Beach, Calif., is handling the drilling work under contract.

The company made the first oil dis-

Put more efficient power to work...



View shows a typical Nordberg 8-cylinder spark-fired gas engine used by a major oil company for pumping crude oil.

...*with* NORDBERG *SUPAIRTHERMAL* Spark-Fired Gas Engines

HIGH thermal efficiency of power-packed Nordberg four-cycle *SUPAIRTHERMAL* Spark-fired gas engines, in excess of 40% at full load, turns low fuel consumption into profit dollars. Designed and built to give years of dependable, economical service, Nordberg Spark-fired Gas Engines are available in sizes up to 4260 horsepower.

For further information write for Bulletin 221.

NORDBERG MFG. CO., Milwaukee, Wisconsin

NORDBERG

DIESEL • DUAFUEL® AND SPARK-FIRED GAS ENGINES

0253

covery in the Australian continent last November when its Rough Range wildcat flowed better than 550 bbl. daily of waxy but light crude from 3,605-3,650 ft. At last report, the well was below 7,000 ft. with drilling slowed by hard formations. This year's program includes a test of the much larger Cape Range structure to the northwest.

It was announced in Perth that the company's budget for further exploration and development this year had been increased to an equivalent of about $6,100,000. This is around $2,200,000 more than original estimates last December. The company plans to drill 11 additional wells in the discovery area this year.

Iran Talks Near

Herbert Hoover paves way for Teheran negotiations

THE way was reported cleared last week for the opening of formal negotiations between Iranian Government officials and representatives of the newly formed international oil consortium.

Members of the consortium's negotiating team were expected to arrive in the near future in Teheran. Herbert Hoover, Jr., special adviser to the U.S. State Department, flew into the Iranian capital to make preparations for the meetings.

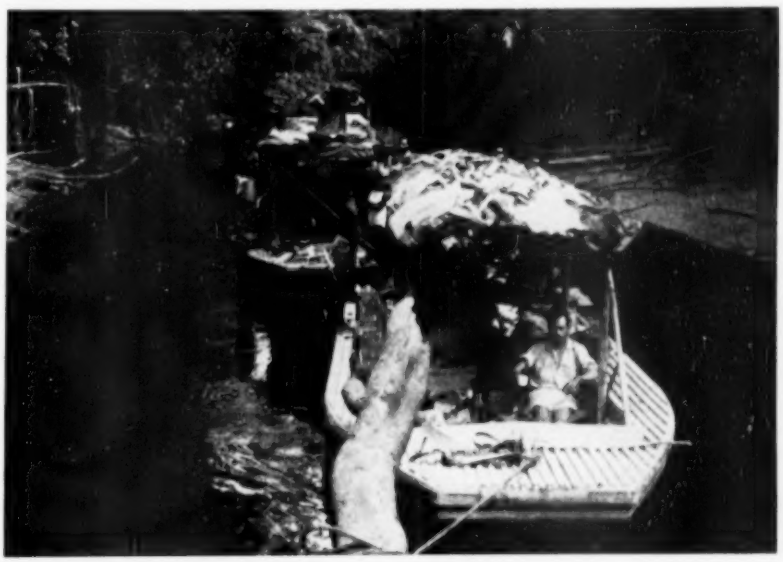
There were indications of growing annoyance on the part of the Iranian Government and public with the delay in the start of the oil-settlement discussions. The government has had to obtain another $6,000,000 from the U. S. Treasury to meet its emergency needs pending resumption of oil operations.

Behind schedule . . . It was originally expected that the consortium's negotiators would have been in Teheran several weeks ago. Delays in efforts to organize the joint oil group were occasioned first by inability to agree on share holding to be assigned Anglo-Iranian Oil Co., Ltd., and secondly, by the amount being asked by Anglo-Iranian for its interests in Iran.

The consortium will provide capital and key personnel to reactivate the Iranian industry and will arrange for distribution of the oil in world markets. Its members are: Anglo-Iranian, Royal Dutch-Shell, Cie. Francaise des Petroles, Standard Oil Co. (N.J.), Socony-Vacuum Oil Co., Inc., Gulf Oil Corp., Standard Oil Co. of California, and The Texas Co.

No official statement has as yet been made on the organization of the consortium. Details on its composition and the proposals it will make to Iran are not expected to be disclosed, since they depend entirely on acceptance by Iran.

Bargaining with the Iranians over the shape the new petroleum industry of the country will take will be difficult, long, and unpredictable. It is understood that the compensation which Iran will pay Anglo-Iranian, along with Iran's counter-claims against the company, will be dealt with as a separate matter aside from the negotiations between the consortium and the government.



BOAT TRAVEL is one of the principal methods of surface transportation for survey parties working in the New Guinea jungles (Anglo-Iranian photo).

Jungle Wildcatters

Despite seven failures, Australasian Petroleum steps up New Guinea exploration; 1954 outlay to total $5,600,000

Dahl M. Duff

EXPLORATION work in the densely jungled Omati area of western Papua in New Guinea is being continued at an accelerated pace this year by Australasian Petroleum Co., Ltd.

Special high-pressure equipment has been installed at the Omati 1 well which last year was carried to 13,743 ft. to become the deepest ever drilled in the Southern Hemisphere. It was suspended when high-pressure gas was encountered and the hole caved, freezing the pipe. The additional equipment presumably will allow tests to be made.

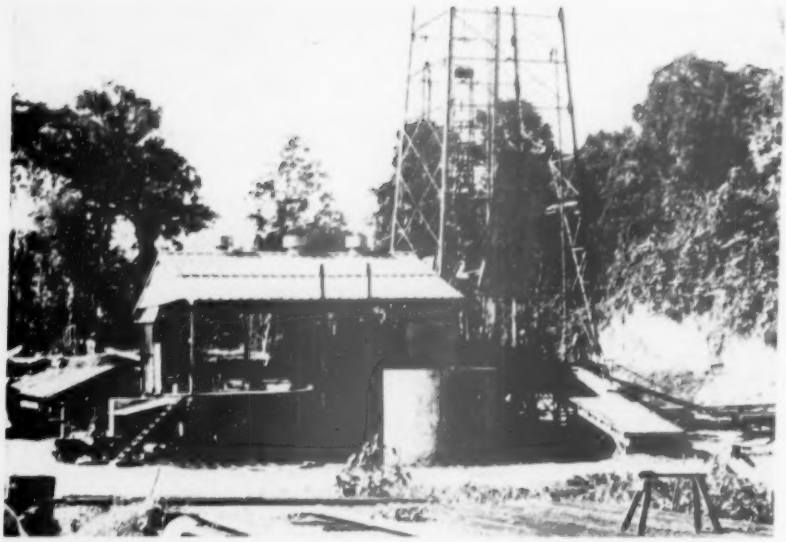
A heavy rig has been set up at the site of a second well 2 miles west of the No. 1, and a location for a third test has been made to the northeast.

The program in the Australian-administered part of New Guinea was commenced before the war. Australasian Petroleum, and a companion company, Island Exploration Co., Ltd., are owned by Anglo-Iranian Oil Co., Ltd., Standard-Vacuum Oil Co., and the Australian firm, Oil Search, Ltd.

Seven noncommercial wells . . . During the current year, the equivalent of some $5,600,000 has been budgeted on exploration by the two companies. To the end of last year, a total of seven holes aggregating 62,645 ft. had been drilled without the discovery of commercial production.

The European staff working in this program numbers about 250, consisting of drillers, geologists, and other specialists. Around 2,500 Papuans are employed as porters and for other duties. D'Arcy Exploration Co., Ltd., Anglo-Iranian's exploration subsidiary, is the operator.

Reasonably rapid travel in the jungle and swamps of Papua is possible only by air or water. All other movement is on paths laboriously cut in advance. Recently the use of helicopters was in-



THE OMATI WELL, at 13,743 ft., is the deepest ever drilled in the Southern Hemisphere (Anglo-Iranian photo).

troduced, and they have been found valuable for speeding up survey progress.

The companies also use flying boats and a fleet of 10 vessels ranging from 20-ton river boats to 200-ton seagoing ships. Indigenous canoes cut from tree trunks but using outboard motors instead of paddles frequently are employed on the rivers.

International Briefs

Reductions in the price of a number of commodities, including gasoline, were recently announced in Moscow. According to Radio Moscow, the price of motor fuel was cut 44½ per cent. The price cuts apparently were a part of the the new Russian policy of emphasizing better and more plentiful consumer goods. As for gasoline and other petroleum products, Russia's current drive to wedge into western oil markets is taken as an indication the country's petroleum supply is at least comfortable.

New drilling in the hope of extending the minor production obtained at Tarakani in New Zealand is being undertaken by Egmont Oil Wells, Ltd. Equipment from the United States is being used, and initially, three wells will be drilled to a depth of around 2,200 ft. A small production operation has been carried out for many years at Tarakani.

A deep wildcat is scheduled to be undertaken in the near future by Sarawak Oilfields, Ltd., in the Suai coastal area of northern Sarawak, about 45 miles southwest of Miri field. The company is a member of the Royal Dutch-Shell Group. Other exploratory work in British Borneo is being carried out by British Malayan Petroleum Co., Ltd., also Royal Dutch-Shell, which operates in Brunei and North Borneo.

Revenues to the Colombian Government from oil-company operations last year amounted to the equivalent of $4,849,856, including surface fees, royalties, pipeline rights, and other direct payments. The total was equal to about 16½ cents per barrel of production.

Yacimientos Petroliferous Fiscales Bolivianos, the Bolivian Government's oil organization, has contracted with Latin American Exploration Co., organized in Panama, for seismograph work in eastern Boliva. Operations are to be undertaken soon east of Sta. Cruz de la Sierra.

Venezuelan Petroleum Co. has doubled its 1954 budget for work in Venezuela to a total of about $10,000,000, according to a recent report from Caracas. The company's third well in the Barinas region, Sinco 3, was reported testing with a depth of 9,693 ft., and in Santa Barbara field, No. 148 has been completed as a dual producer for around 800 bbl. daily. The company is studying the possibility of a pipeline to move Barinas crude to the seacoast.

Congress Plans 200 Papers

More than 200 papers on the scientific progress of the petroleum industry will be presented at the Fourth World Petroleum Congress in Rome, June 6-15, 1955.

About 4,000 executives, engineers, scientists, economists, educators, and equipment manufacturers are expected at the congress. The first meeting was held in London in 1933, the second was in Paris 4 years later, and the last meeting was in 1951 in The Hague.

Committees have been organized in over 30 countries to plan the program. The U.S. National Committee, headed by E. V. Murphree, chairman of the international organization's permanent council and president of Standard Oil Development Co., includes F. S. Clulow, Shell Oil Co.; Paul D. Foote, Gulf Research & Development Co., and J. K. Roberts, Standard Oil Co. (Ind.), vice chairman, and K. G. Mackenzie, secretary.

Chairman of the various sections for the U.S. include: geology and geophysics. Morgan J. Davis, Humble Oil & Refining Co.; drilling and production, A. C. Rubel, Union Oil Co. of California; physical operations in oil processing, H. W. Field, Atlantic Refining Co.; oil processes involving chemical conversions, H. G. Vesper, California Research Corp.; production of chemicals from petroleum, their properties and application, M. E. Spaght, Shell Oil Co.; composition of petroleum, analysis and testing, measurement and control, R. C. Alden, Phillips Petroleum Co.; utilization of oil products, W. M. Holaday, Socony-Vacuum Oil Co., Inc.; construction of equipment, materials corrosion, J. Porter Langfitt, Pure Oil Co.; transport, storage and distribution, T. E. Swigert, Shell Pipeline Corp.; statistics, documentation, education and training, J. W. Boatwright, Standard Oil Co. (Ind.), and George Corless, Standard Oil Co. (N. J.).

Price Posting Initiated

Royal Dutch-Shell has begun posting export prices for crude oil from Seria field in North Borneo.

Sarawak Oilfields, Ltd., a member of the Royal Dutch-Shell Group, announced a price of $2.60 for 37-38° gravity Seria crude, f.o.b. Lutong, in Sarawak, effective April 1. The posting is the first by any crude producer in the Far East.

Production from Seria field in the British protected sultanate of Brunei amounts to slightly over 10,000 bbl. daily.

A.I.M.E. Chairman

For Fullerton executive it's one of many activities

JOHN R. McMILLAN, this year's chairman of the petroleum branch of the American Institute of Mining and Metallurgical Engineers, has always managed to find time for a variety of activities other than those connected with Fullerton Oil Co., of which he is vice president.

This busy executive is at home anywhere he goes. He has done deep-sea fishing, is considered a good gin rummy and domino player, and knows how to handle a shotgun effectively.

All of McMillan's spare time, though, isn't leisure. He also has devoted much time and effort to many industrial and professional activities. He served as finance chairman for two conventions of the American Association of Petroleum Geologists in Los Angeles, and has worked on the general committee of the American Petroleum Institute's Production Division for the last 3 years.

He now heads the Oil Club, the organizing group of the Los Angeles Petroleum Club.

Started as draftsman . . . McMillan first became associated with the petroleum industry while working as a draftsman for Barnsdall Oil Co. during 3 years of his college career. Upon graduation from the California Institute of Technology in 1931, he became a roustabout with Barnsdall and later advanced from assistant to petroleum engineer.

Barnsdall kept him on the move for a few years, then moved him to the land and geological department in Los Angeles in 1937. McMillan remained there until resigning in 1943 to join Fullerton Oil Co. as petroleum engineer and assistant manager of field operations.

His advancement was rapid and in 1947 he was made vice president and director in charge of production and exploration. Probably his biggest achievement since being with Fullerton was the engineering in connection with the unitization of the Clearfork formation of Fullerton field in West Texas. This 600-well unit, which covers 24,000 acres, was put into operation by Fullerton early this year.

McMillan was a member of the first council of the Pacific petroleum chapter of the A.I.M.E. when it was formed in 1946, served as chairman the following year, became later a member of the executive committee of the national organization, and in 1952 was elected national vice chairman of the petroleum branch. He took over duties as chairman in February.

A native of Vermont, he moved to Los Angeles when he was 7 and attended the University of California 2 years before transferring to California Tech.

R. O. Childers, formerly regional drilling supervisor in Tulsa for Atlantic Refining Co., has been appointed general drilling superintendent for the firm in Dallas.

N. B. Mavris, chief engineer and coordinator of construction for Yellowstone Pipe Line Co., has been transferred from Ponca City, Okla., to Spokane, Wash., where he will remain during the building of the Yellowstone products-line project.

G. A. Younie has been made superintendent for Stanolind Oil & Gas Co.'s Kansas producing district, headquartered in Ellinwood. Younie replaces **H. L. Olson,** who has been transferred to Houston on special assignment. **W. R. Franey,** formerly field engineer at Stanolind's Duncan, Okla., area office, also has been moved to Ellinwood as district engineer. He replaces **G. H. Lancaster,** who has moved to Rangley, Colo., as field superintendent. **V. B. Marsh** has stepped up from production foreman at Duncan to succeed Younie, and **A. W. Lang, Jr.,** has been transferred from West Edmond area to Duncan to replace Franey, **J. F. Carter, Jr.,** has been promoted to field engineer at West Edmond replacing Lang.

Bill Hula has been named geologist in Denver for El Capitan Oil Co., Midland, Tex., replacing **Buck Wilson,** who recently resigned.

J. S. Noland and **F. Lewis, Jr.,** have opened a geological consulting office in Midland, Tex.

Howard L. (Pres) Wilson, formerly assistant manager of Warren Petroleum Corp.'s Houston office, has been made general assistant to **John C. Benedict,** manager of Oil Trading Corp.'s Mid-Continent area office in Wichita, Kans.

E. E. EMRICK, JR.

Edward E. Emrick, Jr., director of purchases, has been appointed exploration - production manager of Ashland Oil & Refining Co. He joined Ashland in 1931. During the past 12 years he has headed the purchasing department, and for the present will continue directing its policies. He also has been handling management of several of the company's production districts. **Nace F. Mefford, Jr.,** also has been promoted from production engineer at Henderson, Ky., to chief production engineer in Ashland.

D. O. FREEMAN

Don O. Freeman has been promoted to assistant to **R. B. Warren, Jr.,** president and general manager of Warren - Bradshaw Exploration Co. Freeman will coordinate functions of the executive department with the company's various operational departments.

Edward B. Swanson, 60, assistant director of the Department of Interior's Oil and Gas Division, has retired after 34 years in government service. He joined the Bureau of Mines in 1920 as private secretary to the director, and after more than 14 years with the bureau served successively with Petroleum Administrative Board, as associate director of the Petroleum Conservation Division, Petroleum Administration for War and, since 1950, as special assistant to the Deputy Petroleum Administrator. He was awarded the department's dis-

PERSONALS

tinguished service award and gold medal for public service in 1950.

Phil Andrew, geologist, has joined Ada Oil Co., Houston. He formerly was with Union Sulphur & Oil Corp. in Lake Charles, La.

Gerald Burgess has been promoted by Ohio Oil Co. from drilling superintendent at Casper, Wyo., to district superintendent at Cody, Wyo.

J. B. Saunders, Jr., president of Triangle Refineries, Inc., Houston, has been elected vice president of Texas Eastern Transmission Corp. He has been active in the oil industry since 1922 and in 1937 organized Triangle Refineries in St. Louis. In 1944 the firm's offices were moved to Houston.

Richard A. Sikes, formerly assistant engineer for Core Laboratories, Inc., at Lafayette, La., has joined Gulf Oil Corp. as a geologist at Houston.

R. R. Turner, field superintendent for Stanolind Oil & Gas Co., has been transferred from Elk Basin, Wyo., to Midwest, Wyo.

Sam T. Boltz, Jr., petroleum engineer with The Texas Co., has been transferred from Burden, Kans., to Salem, Ill.

H. E. Freeman, formerly foreman for Sun Oil Co. at Meraux, La., has been made chief gager at Beaumont, Tex., for Sun Pipe Line Co.

H. P. Buser has been promoted by Sinclair Pipe Line Co. from mechanical engineer in the general engineering department to administrative assistant in the executive department. He will assist **E. W. Unruh,** part-interest executive, in handling all joint-ownership and undivided pipeline interests of the company.

Ben F. Ule, formerly petroleum geologist in Washington for the U. S. Bureau of Mines doing geological research on foreign areas, has been appointed chief research geologist for Conorada Petroleum Corp. Before joining the Bureau of Mines in 1949, Ule was in Colombia for 10 years as geologist and paleontologist with the Standard Oil Co. of California organization and Texas Petroleum Co.

Thomas S. Knapp has been placed in charge of the geological department of Leonard Oil, Inc., Mount Pleasant, Mich.

Milton Young, petroleum engineer-trainee with Continental Oil Co., has been transferred from Ponca City, Okla., to Alice, Tex.

J. M. Caldwell has been named managing director of Scottish Oils, Ltd., replacing **Robert Crichton,** who has retired after 58 years in the Scottish oil industry. Crichton was made general manager in 1930 and managing director in 1941.

John L. Creed has retired from Portland-Montreal Pipe Line System. He was general superintendent at Portland, Me., from May 1942 until last August when he was placed in a consulting capacity. Creed was with Standard Oil Co. of Louisiana for 28 years before transferred to Portland-Montreal in 1942. He now lives in Shreveport, La.

W.P.R.A. Executives Attend 42nd Meeting

Twenty-four directors and officers of the Western Petroleum Refiners Association attended the organization's forty-second annual meeting recently in San Antonio. Left to right, seated, are Fayette B. Dow, Washington; L. B. Simmons, Onyx Refining Co., Abilene, Tex.; J. W. Vaiden, Skelly Oil Co., Tulsa; H. T. Ashton, Socony-Vacuum Oil Co., Inc., St. Louis; Roland V. Rodman, Anderson-Prichard Oil Corp., Oklahoma City, president; Reid Brazell, Leonard Refineries, Inc., Alma, Mich., vice president; H. J. Kennedy, Continental Oil Co., Houston, vice president; R. W. McDowell, Mid-Continent Petroleum Corp., Tulsa; Brown L. Meece, Sinclair Refining Co., Chicago; F. M. McCurry, Derby Oil Co., Wichita, Kans.; R. L. Tollett, Cosden Petroleum Corp., Big Spring, Tex. Standing, left to right, are F. L. Martin, Suntide Refining Corp., Corpus Christi, vice president; E. B. McConnell, Standard Oil Co. (Ohio), Cleveland; C. C. Tate, Phillips Petroleum Co., Bartlesville, Okla.; F. C. Moriarty, Aurora Gasoline Co., Detroit; Rex S. Blazer, Ashland Oil & Refining Co., Ashland, Ky.; Lee Haugen, Cities Service Oil Co., Bartlesville; R. E. Luton, Ohio Oil Co., Robinson, Ill.; J. B. Smith, Sunray Oil Corp., Tulsa; Walter Famariss, Jr., Famariss Oil & Refining Co., Hobbs, N. M.; A. F. Reed, Lion Oil Co., El Dorado, Ark.; John S. Wertz, Vickers Petroleum Co., Inc., Wichita, Kans.; L. D. Mann, Cities Service Refining Corp., Lake Charles, La.; and John C. Day, W.P.R.A., Tulsa.

PERSONALS

New A.A.O.D.C. Chapter Elects Officers

Officers have been elected for the new West Central Texas chapter of the American Association of Oilwell Drilling Contractors, organized recently in Abilene. Left to right are George Hunter, General Geophysical Co., Abilene, secretary-treasurer; B. F. Gilchrist, B. F. Gilchrist Drilling Co., Abilene, chairman; and George Straughn, Lauderdale & Straughn, Abilene, vice chairman. Nearly 50 representatives of drilling firms in the West Central Texas area attended the meeting for organizing the A.A.O.D.C.'s fifteenth regional chapter. Among those present were Karl L. Kellogg, Brad Mills, and W. L. McClusky, president, vice president, and secretary of the national association, respectively.

Joe B. Avant, geologist, formerly with Stanolind Oil & Gas Co., has joined British American Oil Co., Ltd., in Tyler, Tex.

Ward F. Rosen, formerly process engineer in Magnolia Petroleum Co.'s technical department at Beaumont, Tex., has joined Atlantic Refining Co. at Merryville, La., as assistant plant superintendent.

F. W. Stewart has been made field representative for Cities Service Oil Co.'s crude-oil-supply division in Louisiana with headquarters in New Orleans. He joined Cities Service in 1936 and since 1951 has been assistant cashier in Bartlesville, Okla.

Albert Lager, former U. S. State Department petroleum attache in Bogota, Colombia, and Cairo, Egypt, has joined Conorada Petroleum Corp. as its representative in Tripoli, Libya. He succeeds **W. F. Penniman,** who has been transferred to Cairo to the staff of Egyptian American Oil Co., which will operate the Western Desert concession recently obtained by Conorada. Penniman formerly was with the State Department, on its petroleum-policy staff in Washington, and previously was petroleum attache in Lebanon, Chile, and Venezuela. **Dr. Ruthven Pike** has been named resident manager for Conorada's operations in British Somaliland with headquarters at Sheikh, the former summer capital of the Somaliland administration. Pike formerly was with Conorada in Turkey, Venezuela, and Peru.

Arthur G. Sullivan, Jr., has been promoted by Ohio Oil Co. from petroleum engineer at Shreveport to district petroleum engineer at Haynesville, La.

John B. Maughan, formerly reservoir engineer with British American Oil Co., Ltd., has joined Stanolind Oil & Gas Co. in Calgary, Alta.

Walter D. Abel has retired as mining and petroleum engineer for California's state division of corporations to open consulting offices in Los Angeles.

William H. Horner has resigned as a vice president of Sunray Oil Corp. Horner joined Barnsdall Oil Co. in 1943 as manager of the secondary-recovery department and moved into the Sunray organization when the two companies were merged. Since 1950 he has been manager of Sunray's reservoir-engineering department and was chairman of the engineering committee of the Scurry Area Canyon Reef Operators Committee (SACROC) which unitized Kelly-Snyder field of West Texas. Horner's immediate future plans have not been announced.

DEATHS

Pierre Samuel du Pont, 84, one of the founders of E. I. du Pont de Nemours & Co. Inc., died April 5 in Wilmington, Del.

Richard A. Hodges, 72, independent operator, died recently in Fort Worth. He entered the oil business at Ranger, Tex., during the oil boom there and was still active in the industry at the time of his death.

Alex U. McCandless, 73, president of Mahutska Oil Co., died recently in Robinson, Ill.

Charles Hayward Murphy, 84, died April 3 in El Dorado, Ark. He founded Murphy Corp., now headed by his son, C. H. Murphy, Jr.

Arthur C. Mengel, chief chemical engineer of American Locomotive Co. and an authority on diesel locomotive fuel specifications, died recently in Ballston Lake, N. Y., following a heart attack.

A. S. Kaplan, about 60, Tulsa independent oil man, died recently in Miami, Fla., following a heart attack.

Louis A. Brouilette, 54, died April 4 in Houston following a heart attack. He had been with the oil and gas department of Second National Bank in Houston since 1947.

Harry Porter Carroll, 60, vice president and operating manager of the Texas distribution division of United Gas Corp., headquartered in Beaumont, died in Rochester, Minn., April 6. He entered the gas industry in 1911 as a map maker for the old Beaumont Gas Light Co.

Ellis E. (Josh) Williams, 60, Beaumont, Tex., who retired in 1952 after serving Humble Oil & Refining Co. for 32 years, died at Silsbee, Tex., March 25 of a heart attack. He formerly was superintendent of Humble's Crowley, La., division.

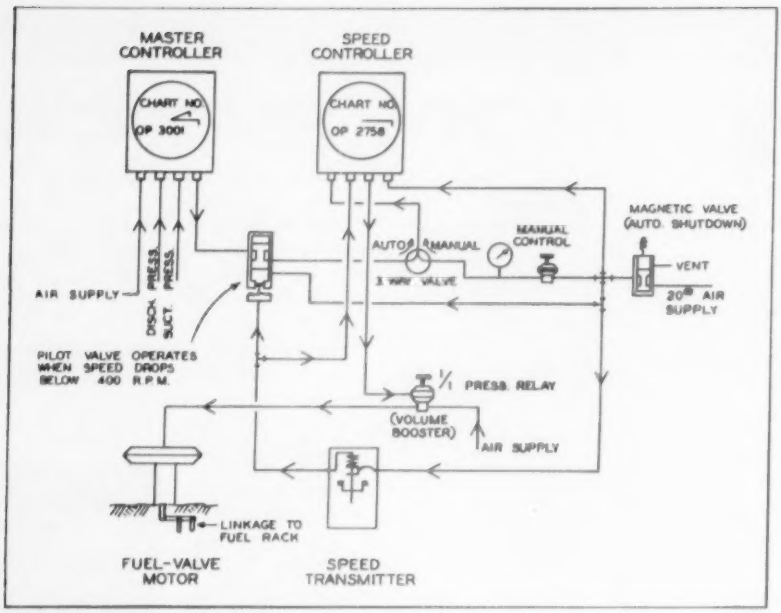


Fig. 1—Schematic of control system for unit No. 4. Success with this system led to installation of controls for all engines.

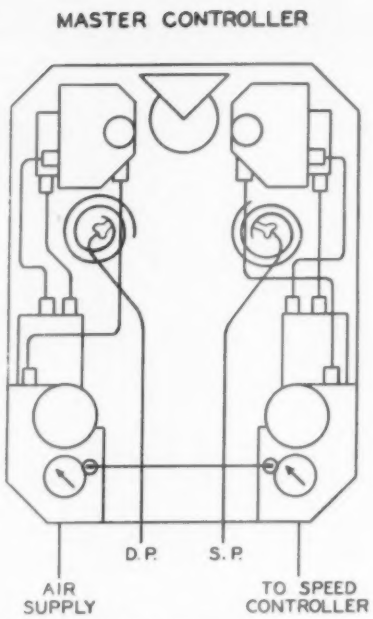


Fig. 2—Simplified diagram of master instrument. Pressure from discharge and suction manifolds regulates air to remainder of control system.

AIR-OPERATED CONTROLS POINT WAY TO

Increased Efficiency at Pump Stations

System adjusts engine speed to load

by R. G. Deering
Assistant Pipeline Editor

A PNEUMATIC control system, recently installed by The Texas-Empire Pipe Line Co. at its Patoka, Ill., crude-oil pump station, has increased the pipeline load factor and raised the station operating efficiency. This control system accurately adjusts diesel-engine speed to meet pipeline load requirements. In addition, it provides a number of safety features which cause the engines to shut down automatically in case of emergency.

Station operation . . . The Patoka station is equipped with four diesel engines which drive centrifugal pumps. Units 1, 2, and 3 are 6-cylinder, 975-hp. engines, and No. 4 is an 8-cylinder, 1,200-hp. model. The station pumps into the Texas-Empire 18-in. line extending north, and also into the Texas Pipe Line Co. 12-in. line to the east.

Normal procedure is to parallel two of the smaller units and series this combination with the large engine for pumping through the 18-in. line. One of the smaller diesels is thus available as a spare or can be used to pump into the 12-in. line. This allows all pump units to work on the more efficient portion of their head-capacity curve and allows full loading of the 1,200-hp. engine.

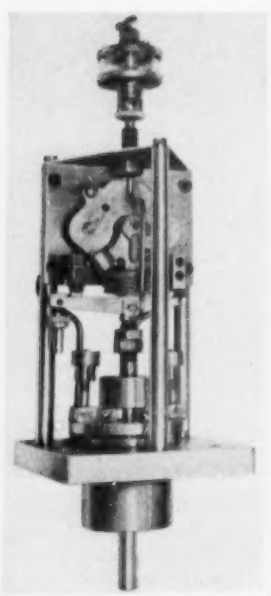


Fig. 3—Pneumatic speed transmitter which is geared to engine.

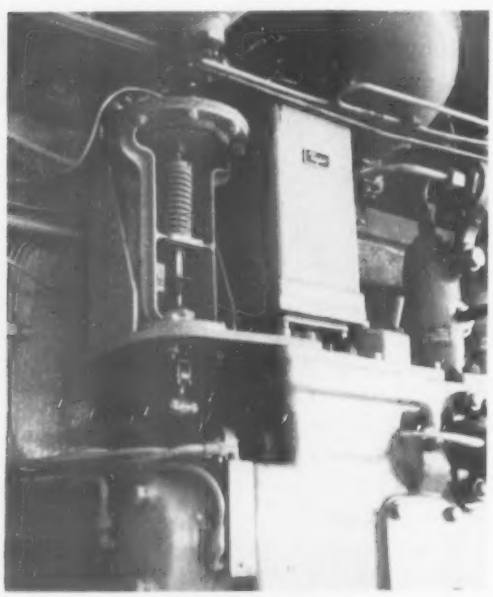


Fig. 4—Fuel-valve air motor and speed transmitter mounted on engine. Drive rod of air motor is connected to fuel rack of engine.

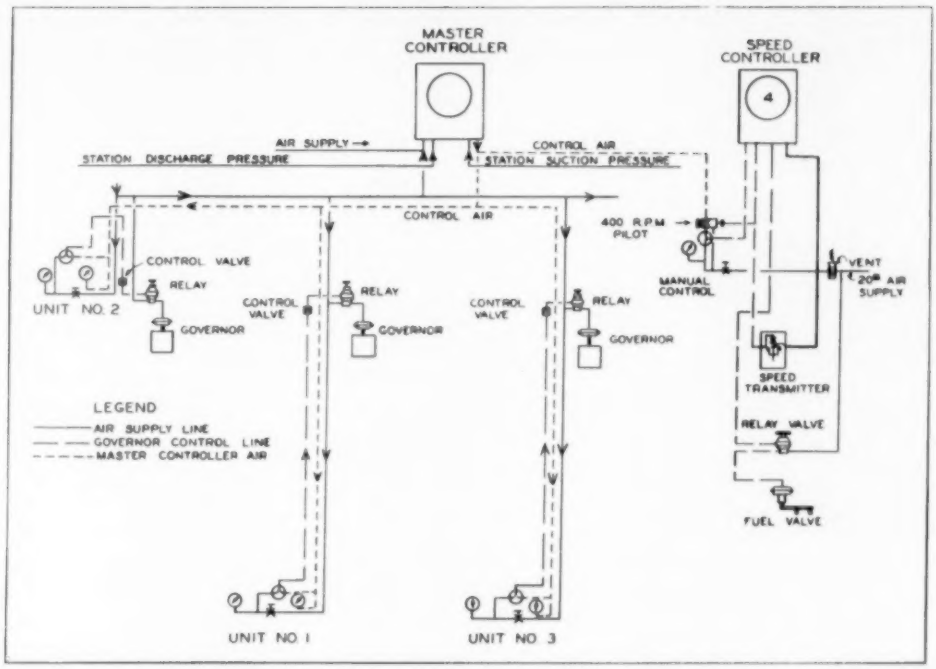


Fig. 5—Diagram of integrated control system in which speed of all engines is governed by signals from the master instrument.

Speed-load control . . . For full utilization of pipe-line capacity it is necessary that engine speed be controlled very closely to meet varying load conditions. In this case the load consists of crude slugs of various gravities and viscosities and the attainment of maximum pumping efficiency requires almost constant adjustment.

This control system performs these adjustments with minimum lag and with a degree of accuracy that could not be approached by manual methods. For example, during one month the average station discharge pressure was 849 psi. compared to a desired pressure of 850 psi. Maximum daily-average pressure recorded in this period was 850 psi. and the minimum average was 841 psi. The low daily averages were caused by temporary shutdowns for minor engine adjustments and are in no way a reflection on the performance of the control system.

Single-Unit Control

The original speed-control system, shown schematically in Fig. 1, was designed for regulating speed of the 1,200-hp. unit only. Its major features are the master controller, the speed controller, the speed transmitter, and the fuel-valve motor.

The master controller senses a deviation in suction or discharge pressure from their proper value and signals the speed controller for a new engine speed to correct the condition. The set point of the speed controller is shifted as a result of these pressure signals from the master controller. Air pressure from the speed transmitter, which varies in accordance with engine speed, is then compared with the air pressure corresponding to desired engine speed. From this comparison, the speed-controller output to the fuel-valve motor is changed so as to minimize the difference between desired and actual speed.

During steady load conditions the speed transmitter and controller act together in smoothing out small speed variations.

Master controller . . . This instrument (Fig. 2), is an override controller in which output air pressure is regulated according to pipe-line pressures. Lines from both the suction and discharge manifolds are connected to bourdon tubes within the instrument. Linkage from these bourdon tubes actuate pilot valves which are in series in the air-supply line to the remainder of the control system.

Since the pilot valves are in series, either suction or discharge pressure can regulate the air output of the instrument. These are primary controls and will override all other signals in attempting to hold the load constant.

The amount of pressure, either high or low, at which the controller will begin to operate can be set manually by station operators. In the particular system described here, the maximum discharge pressure is set at 850 psi. and the minimum suction pressure is held at 15 psi.

Within the limits of maximum engine speed and capacity, the master controller will hold station discharge at 850 psi. unless station suction tends to fall below 15 psi. In this case, the controller will call for a reduction in engine speed to maintain proper suction pressure.

When neither a condition of high discharge pressure nor one of low suction pressure exists, the controller valves are open completely and a full supply of air is transmitted to the speed controller. The engines then run at full speed and maximum throughput is attained for that particular load.

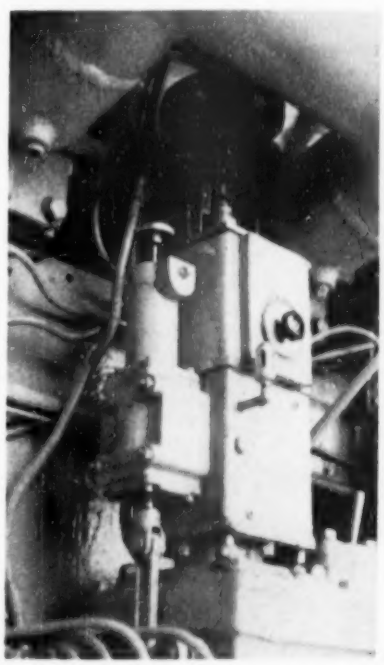


Fig. 6—Modified governor of one of the 975-hp. engines. Note that the controlling air motor is mounted above the governor.

A spring-driven chart for recording of suction and discharge pressure is provided in the instrument.

Speed controller . . . The primary function of this instrument is to supply control air to the fuel-valve motor for the

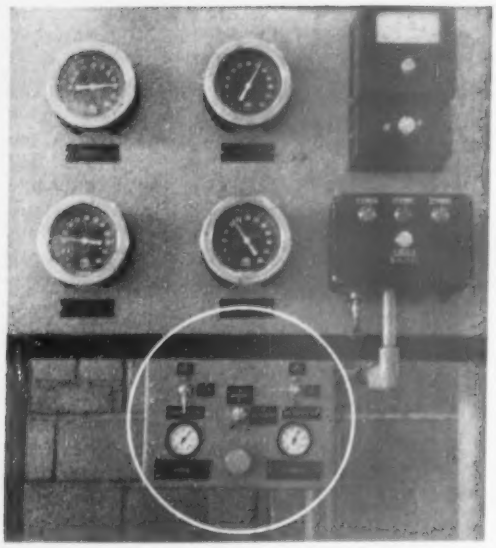


Fig. 7—Pneumatic switching panel for changing from automatic to manual control or vice versa. Panels are mounted on gage boards of each engine.

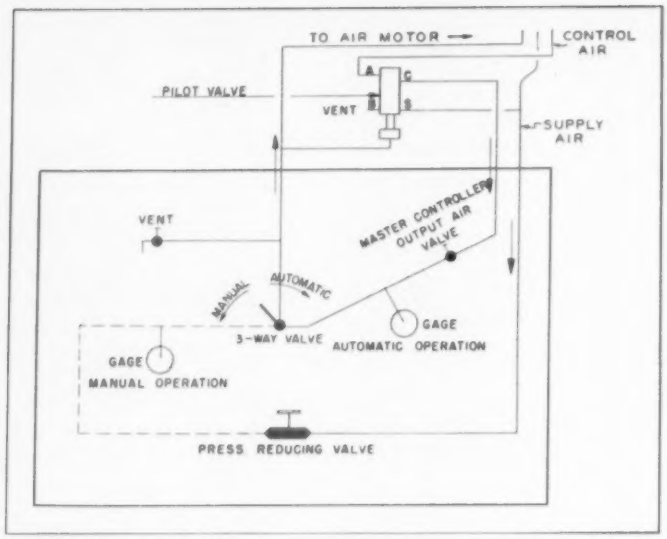


Fig. 8—Schematic of switching panel. Pressures must be equalized on the two gages before switch is made.

positioning of the engine fuel rack. Its control point, being engine speed in this case, is pneumatically adjusted by signals from the master controller. Signal air pressure from the speed transmitter and pressure corresponding to the desired speed, as established by the master controller, are compared in a double-bellows chamber. Linkage from this chamber controls a pilot valve in the air line to the fuel-valve motor. Deviation from the desired speed causes a change in air supply to the air motor and a consequent change in fuel-rack position. Thus, the fuel supply is continually adjusted to keep engine speed at the desired point.

A mechanical stop in the set-point linkage allows manual setting of the maximum engine speed. This stop cannot be overriden by signal from the master controller.

Air pressure from the speed transmitter is continuously recorded in the speed controller on a chart calibrated directly in engine r.p.m.

Speed transmitter . . . This device, pictured in Fig. 3, is geared to the fuel-pump camshaft of the engine and consists primarily of a rotating table, flyweights, and a pneumatic force-balance assembly.

Centrifugal force developed by the rotating flyweights is transmitted by rocker arms to a nonrotating-vertical spindle and to the shaft of a pilot valve. The pilot valve allows air to enter or leave a bellows chamber which is also connected to the vertical spindle. In this manner the force developed by air pressure in the bellows chamber is used to balance the centrifugal force of the flyweights and thus maintain equilibrium between the two.

In operation, a very small change in position of the flyweights causes full opening of the pilot valve; consequently, the radius of the flyweight circle remains essentially constant and the force exerted varies as the square of the speed. Output air pressure, equal to the pressure in the

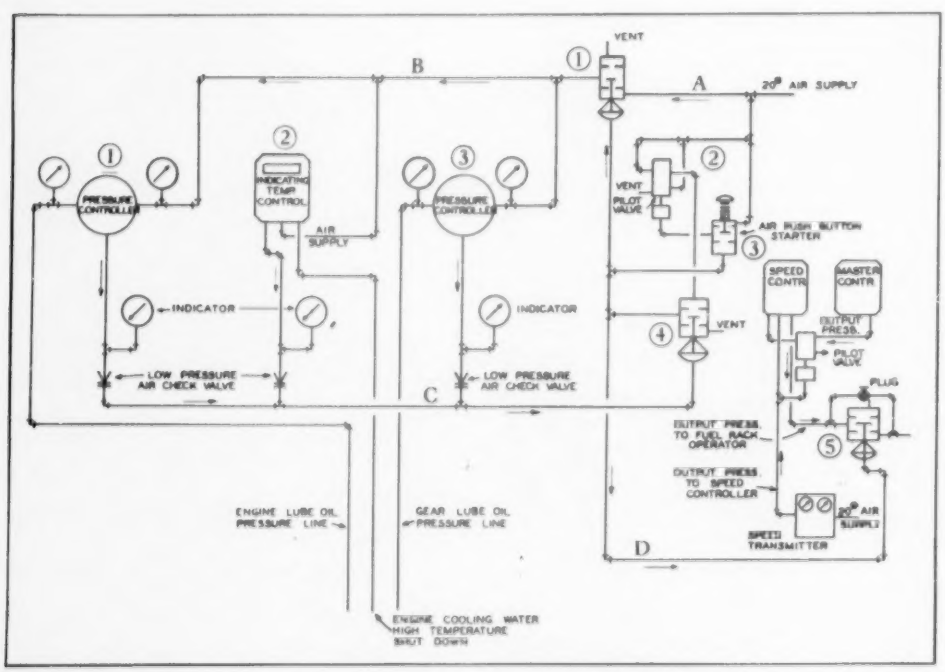


Fig. 9—Safety shutdown network to protect against engine component failure. Note that annunciator on controller 3 indicates failure of signal pressure there.

bellows, varies in the same manner.

Fuel-valve motor . . . An air motor, having a rubber diaphragm instead of the more conventional copper one, is used to make position changes in the fuel rack. This motor, shown mounted beside the speed transmitter in Fig. 4, receives its air supply from the volume booster connected to the main air line. Air signals from the speed controller act directly on the volume-booster pilot valve.

Volume boosting is necessary since the control lines are of small diameter and cannot supply the amount of air required by the air motor.

Low-speed shutdown . . . The characteristics of the control system are such that under certain load conditions, the master controller would require a speed below the critical limit of the engine. This would result in rough operation and heavy, dangerous vibrations which could do considerable damage to engine parts.

To protect against this, a slow-speed cutoff has been installed in the control-air line from the master controller. The device is a spring-loaded valve which balances air output from the speed transmitter against control-air pressure. At all speeds above 400 r.p.m. the valve is in operation but at lower speeds it acts to shut off the air supply from the master controller and vent the remainder of the control system. This removes all pressure from the volume booster relay, causes the fuel-valve motor to close the fuel rack, and kills the engine.

Early difficulties . . . During the early life of the system considerable trouble was experienced with the speed transmitter. Rapid wear in the flyweight assembly was responsible for erratic control, engine speed drift, and over-all poor performance.

An analysis of the trouble indicated that vibration, inherent in the engine operation, was the basic cause. Several measures were taken to reduce vibration and shock to the transmitter case. The solid drive shaft was cut in two pieces and joined with a male-female three-jawed coupling. A neoprene spider was placed between the jaws to help absorb vertical shock. The case proper was mounted on a ¼-in. cork gasket and fastened to the engine with spring-loaded cap screws. These innovations worked very satisfactorily and after 18 months the speed transmitter is still in service.

J. T. Howard, division foreman in the northern division of Texas-Empire, is credited with the design changes which corrected the trouble.

Multiunit Control

After operation with the control system of the large engine had proved successful, it was decided to expand the system and place the smaller units under control. W. R. Nelson, assistant chief engineer of Texas-Empire, and J. T. Howard, mentioned previously, designed a workable system and were responsible for its installation. The integrated system is shown in Fig. 5.

Governor modification . . . The three six-cylinder engines at the station were originally equipped with isochronous-hydraulic governors which had to be modified for adaptation to the remote control system.

In this type governor there is a vertical valve rod which is acted on by two forces. A centrifugal force from rotating flyweights is applied to the rod and is opposed by force from a compression spring, called the speeder spring, which is seated on the rod. As the engine speed varies from a preset point, movement of this rod allows oil under pressure to act on a power piston which is connected to the fuel rack. The position of the fuel rack is changed by movement of the power piston and the engine speed is adjusted back to the desired point.

To change the speed set-point, i.e., the speed at which the governor will hold the engine, it is necessary to increase or decrease the compression of the speeder spring. This spring is seated on an adjustable stop, called the speeder-spring plug, as well as on the valve rod. Thus, changes in the position of the plug will change compression of the spring, will cause a corresponding change in the valve-rod position, and will establish a new engine speed.

A dial mechanism geared to the speeder-spring plug provides the means for making this adjustment at the engine.

In modified version pictured in Fig. 6, an air motor is mounted above the governor and operates a push rod extending to the speeder-spring plug. The dial mechanism is disengaged and the force from the push rod is used to set the position of the plug. The air motor, supplied from a volume booster, is controlled by air from the master controller.

The modified governors operate in the same manner as before with the exception that the speed set-point is varied according to station load. Thus the system is compatible with that used on the No. 4 unit; the modified governors merely replace the speed controller and the speed transmitter.

Low-speed cutoffs, similar to the one used on the larger engine, are provided for the three 975-hp. units. They are set to operate at 450 r.p.m.

Automatic-manual switching . . . A pneumatic switching panel, shown in Fig. 7, is placed on the gage board at each of the smaller engines. This control network, which is diagramed in Fig. 8, allows operators to switch from manual to automatic control or vice versa as the situation requires.

In making the switch from one to the other method of control it is only necessary for the operator to adjust the manual control valve until the manual gage shows the same pressure as the automatic gage. The three-way valve is then moved to the desired position and the switch is complete. If the two pressures are the same at the time of switching, there will be no change in supply pressure to the air motor and the engine will not change speed.

A switching system very similar to the one above was included in the control system originally installed in No. 4 unit.

Automatic Shutdown

In a modern diesel station with its high-speed equipment, it is mandatory that precautions be taken against failure or malfunction of vital engine components and accessories. A number of safety features have been added to this control system, one of which is the low-speed cutoff described previously.

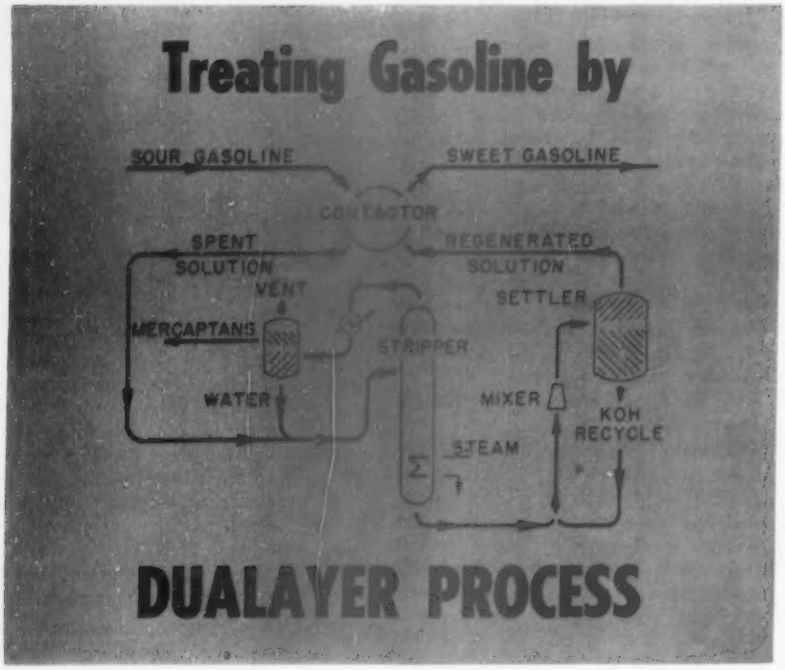
Additional insurance features were added with the installation of an air-operated system which is shown in Fig. 9. This network protects against loss of engine lube-oil pressure, gear lube-oil pressure, or abnormal increase in engine cooling-water temperature. The second feature protects the speed increaser which couples the pump and engine.

How it works . . . After the engine is started and signal pressures have had a chance to build up, the system is made operative by depressing the push button of valve 3. This allows air to enter line D and the diaphragms of valves 1 and 5. These two valves are normally closed but open immediately with the application of air pressure. The plug valve which shuts valve 5 is then closed and control air to the fuel-valve motor goes through valve 5. In the meantime, valve 1 has opened and air pressure is present in line B and at controllers 1, 2, and 3.

Under normal operating conditions the valves within the three controllers will be held closed by signal pressure from the engine or gear box.

Valve 2 acts as a holding relay and keeps pressure on the system after the push-button valve is released.

(Continued on page 149)



by C. A. Duval and V. A. Kalichevsky

EXTRACTION of mercaptans from petroleum products is preferable to their conversion to disulfides because of the reduction in sulfur content of the treated distillates. Disulfides left in the oil may be even more harmful to oil quality than the original mercaptans.[2] The importance of complete removal of mercaptans from gasoline as compared to their conversion to disulfides may be visualized from data presented in Table 1.

These data show that in treating gasolines normally encountered at a refinery savings of $160 of TEL per thousand barrels are not unusual because of an increase in the octane number of the leaded gasoline. In many instances considerably greater savings can be obtained depending on the quantity of mercaptans present and the desired octane number of the product. The Dualayer process secures a doctor-sweet product by extracting mercaptans and not converting them to disulfides which remain in the oil.

Authors are in technical department, refining division, Magnolia Petroleum Co., Beaumont. Paper presented at annual W.P.R.A. meeting, San Antonio, March 29-31.

TABLE 1—TYPICAL TEL SAVINGS FOR DUALAYER PROCESS OVER DOCTOR TREATING

Gasoline—	Octane, R-39 + 3cc. TEL: Doctor	Octane, R-39 + 3cc. TEL: Dualayer	TEL savings,* $/1,000 bbl.
Absorption	84.0	85.6	90
Thermal	83.2	86.0	160
Straightrun	85.9	87.2	70

*TEL at .231 cent per cc.

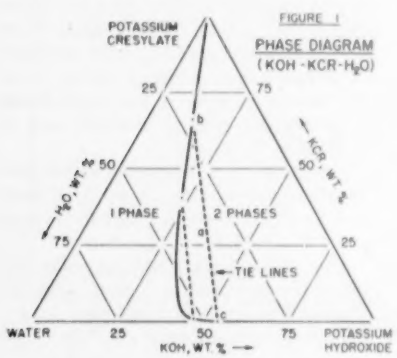
Caustic treat . . . Mercaptans are acidic and alkalies react with them. However, alkalies alone are seldom capable of extracting all mercaptans with the possible exception of the lightest members of the series. Complete removal of mercaptans from petroleum distillates with conventional aqueous alkali hydroxides is attained only in very rare instances.

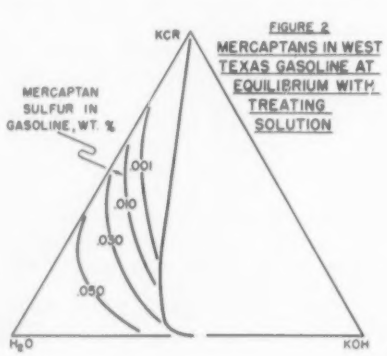
The addition of organic acids, referred to as solutizers or solventizers,[3] improves the mercaptan-extraction efficiency of aqueous alkali hydroxide solutions. However, improvement obtained by existing processes is seldom adequate to insure sufficient removal of mercaptans to give products sweet to the doctor test.

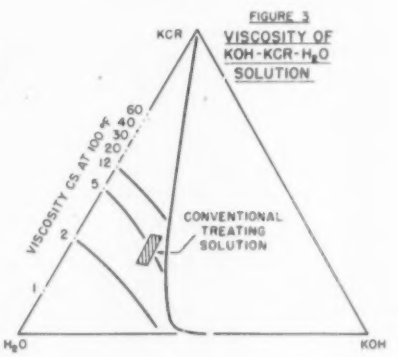
Investigation of caustic solutions containing organic acids revealed that at certain concentrations two immiscible layers are formed which are also immiscible with the oil. Commercial processes now in use employ one-phase solutions of composition fairly remote from this critical region in order to avoid such separations. The new process developed at Magnolia Petroleum Co. utilizes the two layers and is referred to as the Dualayer (dual layer) process.

The principles on which the process is based are applicable to a large variety of systems involving alkali hydroxides, water, and organic substances. For illustration purposes, the system consisting of potassium hydroxide, water, and cresylic acid was selected.

KOH used . . . Potassium hydroxide has a considerable advantage over sodium hydroxide for extraction of mercaptans. On account of their low viscosity, potassium hydroxide solutions can be used commercially in highly concentrated form. The mercaptan extraction power of these concentrated solutions is high. Losses of potassium hydroxide due to entrainment are less than with sodium hydroxide because of this difference in viscosity. For this reason, in regenerative processes the cost of potassium hydroxide is usually less than that of sodium hydroxide and the extractive power is greater.







Cresylic acid is a mixture of acidic organic substances present in the petroleum distillates from which the mercaptans are removed. Caustic solutions extract these compounds and no outside source is normally required to supply them to the process. In the few instances where distillates are deficient in these acids, they may be obtained from treating other refinery stocks. Composition of cresylic acid from petroleum varies with the nature of the distillate but these variations are minor and do not affect the process efficiency.

Three-Component Systems

Three-component systems are conveniently represented by triangular diagrams. A typical diagram for potassium hydroxide, water, and potassium cresylate system is given in Fig. 1. In this instance cresylic acids extracted from catalytically cracked gasolines were employed. Cresylic acids from other sources may slightly affect the position of the boundary line separating the one and two-phase regions. The tie line **a** on the diagram shows the composition of the two layers if the total composition of the mixture corresponds to any composition intersected by the line. The actual compositions of the two layers are represented by points **b** and **c.**

In choosing the most desirable composition of the treating solution for commercial use, several factors must be taken into consideration. The most important of these are the extraction power for mercaptans and viscosity.

Extraction power of solutions for mercaptans may be visualized from concave curves on Fig. 2. They show that the extraction efficiency improves as the curves approach the two-phase region. It also improves with the change in composition of the treating solution as it nears the KCr apex of the triangular diagram given in Fig. 2. In the diagram KCr is used as an abbreviation for potassium cresylate and H_2O and KOH are the conventional chemical symbols for water and the uncombined potassium hydroxide.

Viscosities of the solutions are represented by the convex curves on Fig. 3. Viscosities decrease as the curves approach the H_2O apex on the diagram. Separation of treating solution from the treated distillate is a function of the viscosity of the treating solution. Good separation is obtained with solutions having viscosities below 12 cs. at 100° F. Solutions of considerably higher viscosity can be used successfully with proper mixing and settling equipment and with continuous filtration of the solution to remove impurities.

Fig. 4 shows that for a given viscosity the highest extraction efficiency is obtained by a solution having a composition on the two-phase boundary line. This is true for viscosities above 5 cs. at 100° F. Extraction efficiency and viscosity lines in Figs. 2 and 3 are superimposed in Fig. 4.

Equilibrium curves . . . Equilibrium curves for cresylic acid concentrations in the treating solution and in gasoline are shown in Fig. 5. These curves are important for calculating the amount of cresylic acids introduced with the fresh distillate that will be absorbed by the treating solution or released to the distillate.

The shaded regions on Figs. 4 and 5 represent compositions of conventional treating solutions recommended for use commercially at the present time. It may be seen that the ultimate ability of these solutions for extracting mercaptans has not been utilized. This is also demonstrated by the data presented in Table 2 on mercaptan extraction by the Dualayer and conventional solutizer solutions from a West Texas straightrun gasoline.

Data are presented on percentage basis for better visualization. The 100 per cent removal of mercaptans corresponds to a product sweet to the doctor test and containing less than 0.0005 weight per cent mercaptan sulfur.

TABLE 2—MERCAPTAN REMOVAL BY DUALAYER AND SOLUTIZER SOLUTIONS FROM WEST TEXAS GASOLINE

Treating solution—	Solution to gaso. ratio, vol.	Mercaptan removal, per cent: One stage	Two stages	Three or more stages
Dualayer	0.02	91	100	100
Solutizer	0.20	71	80	93
	0.40	84	93	96

Note: Initial mercaptan sulfur = 0.110 wt. per cent.

Effective removal . . . The tabulated data show the ease with which the mercaptans are removed from the oil by the Dualayer process. With the conventional treating solutions, the doctor-sweet products could not be obtained even by raising the solution to distillate ratio more than 20 times above that employed in the new process.

The exceptional performance of the Dualayer process is due to the fact that the potassium hydroxide, potassium cresylate, and water content of the treating solution are completely under control. Treating solution composition on conventional solutizer units is normally out of control and reaches an unfavorable equilibrium for mercaptan extraction. The water content or boiling point of the solution is usually the only method used to adjust composition and the potassium hydroxide to potassium cresylate ratio varies until it reaches equilibrium with the organic acids in the oil.

The resulting solution is deficient in potassium hydroxide and is relatively ineffective for the extraction of mercaptans. High treating ratios and large strippers are required with this type of solution for even partially satisfactory results. In the Dualayer process the water content and the potassium hydroxide content are both controlled. The water content is controlled by the stripper temperature and the potassium hydroxide content by the equilibrium with the potassium hydroxide-water layer in the equilibrium drum.

Since the solution consists of only three major components, control of two of them automatically controls the third. In other words, the Dualayer solution has only one degree of freedom and the stripper temperature controls its composition. Conventional solutions, with only one homogeneous phase, have two degrees of freedom and cannot be controlled satisfactorily by the stripper temperature alone.

Regeneration . . . Regeneration of the Dualayer solutions is easy. Less than 10 lb. of steam per barrel of gasoline

(Continued on page 150)

FIGURE 4

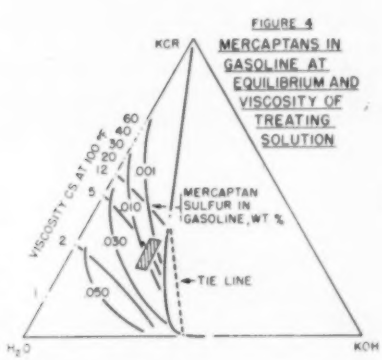
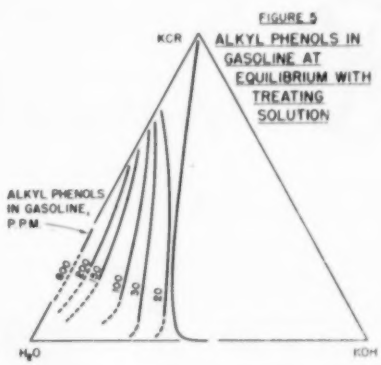


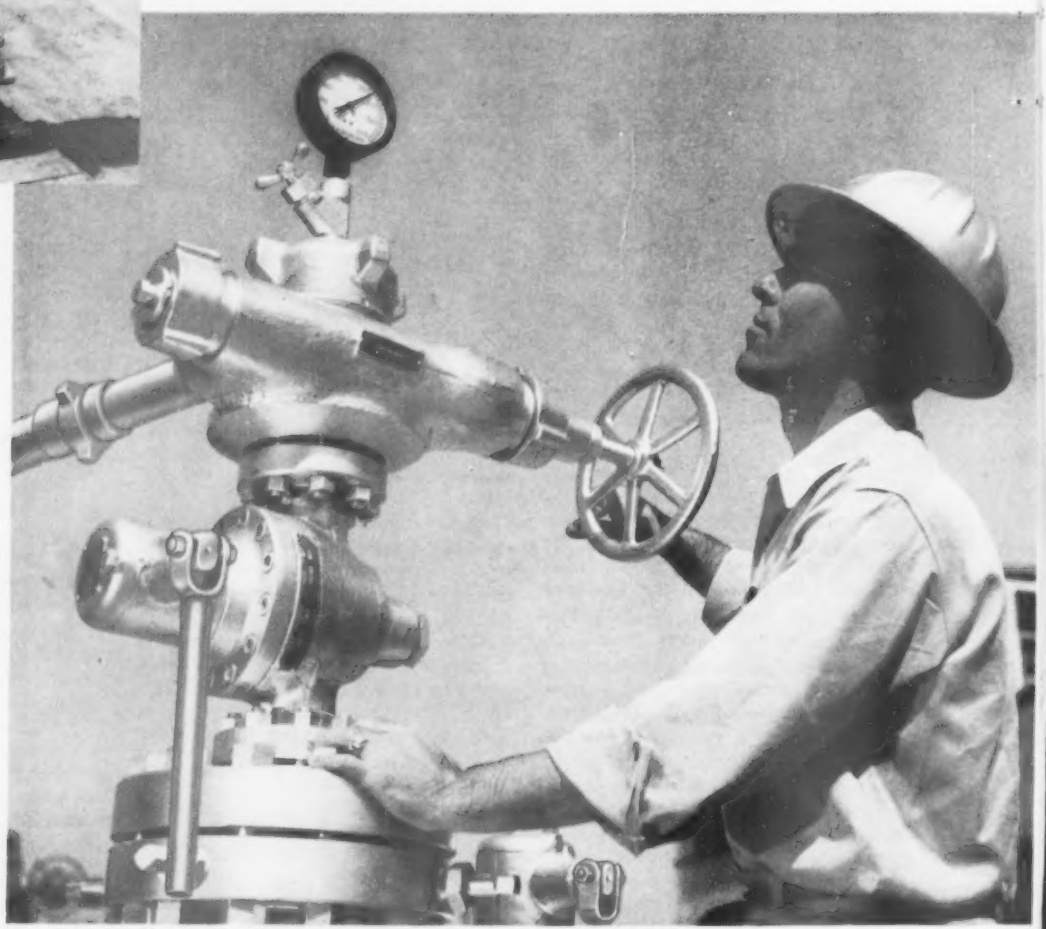
FIGURE 5



THE NEW *Cameron* FLOW CONTROLLER

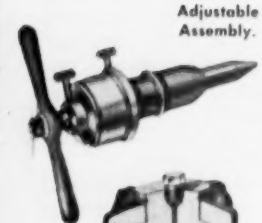
. . . perfection in production control

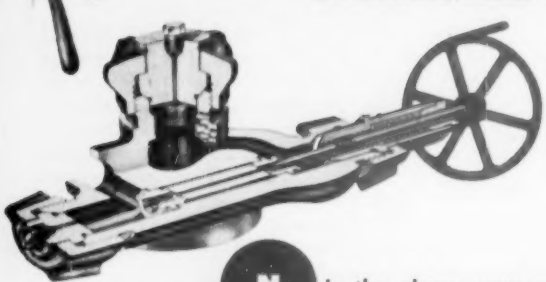
A Cameron Christmas Tree equipped with Flow Controller.



- Replaces conventional tee, choke, wing valve, top cap and their connections.
- Readily interchangeable with popular Cameron Type "H" Production Choke.
- Easily convertible to positive or adjustable choke, or a combination of both.
- Reduces weight of tree without sacrificing safety.

Adjustable Assembly.





N in the above cross-section view that flow may be shut off by means of a replaceable seat and valve assembly. Downstream from the valve a positive flow bean (shown in position) or an adjustable choke assembly (shown removed) may be used. To change the flow bean it is only necessary to close the valve element, unscrew the bonnet nut, and then unscrew the bean retainer which carries the flow bean in a sleeve. The positive choke may be converted into a combination positive and adjustable by substituting the adjustable choke assembly for the blanking plug. If an adjustable choke alone is desired it may be obtained by removing the positive flow bean and re-installing the bean retainer which serves as a seat for the adjustable needle.

Cameron

IRON WORKS, INC.

P. O. Box 1212, Houston, Texas

Export Office: 7912 Empire State Bldg., New York City • In England: British Oilfield Equipment Co., Ltd., Duke's Court, St. James's, London, S.W. 1, England

Produced gas after processing is injected along the upper limits of the field and salt water along the lower limits so that recovery is effected by combination water-flood and gas-cap expansion.

Unitized Production Is Economical Production

Evidence? Here's a before-and-after accounting with convincing proof

by Ed McGhee
District Editor

THE benefits of unitization are not all belowground. An example of the savings on the surface that may grow out of unitized operation is the Southwest Antioch Gibson Sand Unit (SWAGSU) of Garvin County, Oklahoma.

Before unitization of the field, there were 199 individual lease tank batteries; now there are only 12. Before, pumper labor and travel expense from battery to battery was high; now, after unitization, pumper labor is more efficient, and the travel expense is far less.

Before unitization, gas was flared at some batteries because it was not economically feasible to collect gas from every single battery; now, no gas is flared.

Phillips Petroleum Co., as operator of SWAGSU, is representing Magnolia Petroleum Co., Skelly Oil Co., Sinclair Oil & Gas Co., Globe Oil & Refining Co., Mid-Continent Petroleum Corp., Vickers Petroleum Corp., Anderson-Prichard Oil Corp., Phillips, and several other smaller holders.

Repressuring and flooding . . . Between initial discovery in 1946 and unitization in 1948 the Gibson sand, a solution gas-drive reservoir, was observed to be steadily declining in pressure. Therefore, unitization was effected to allow water flooding along the lower boundaries of the field and injection of produced gas along the upper boundaries.

The participants in the unit thus provided for a greater oil recovery, and also permitted the salvage of a large part of the investment in individual lease equipment. Moreover, production operations are much less expensive.

The 12 modern consolidated tank batteries that replace almost 200 old lease tank batteries incorporate these features:

1. Manifolding of lead lines at the battery to permit switching any well into any system in the battery.
2. A high-pressure separation system at 500 psi.
3. A low-pressure separation system at 15 psi.
4. Metering of gas going to collecting system.
5. Wet-oil treating facilities.
6. Facilities for testing any well.
7. At two of the batteries, filters and pumps for salt-water injection.
8. High-pressure triplex pumps for power oil to producing wells' hydraulic pumps.
9. Automatic shutdown when all tanks are full.
10. Automatic shutdown in case of high liquid level in separators.

11. Automatic pump engine shutdown for low oil pressure, high water temperature, or overspeeding.

12. Automatic bypass control on power-oil pumps to maintain constant pressure on hydraulic well pump system.

Photograph shows manifold and separators in one of the batteries. Two separators are used in series in the high-pressure system to prevent carry-over of oil into the gas-gathering lines. The indirect heater is used only in cold weather to prevent the formation of hydrates.

Well head shut in . . . Besides the automatic shutdown features in the tank batteries, each well is equipped with a high-low pressure shutdown. Thus, when any of the valves in the lead line or in the tank battery are closed (or when excessive paraffin deposition blocks the line) the increase in back pressure will close in the well at the well head.

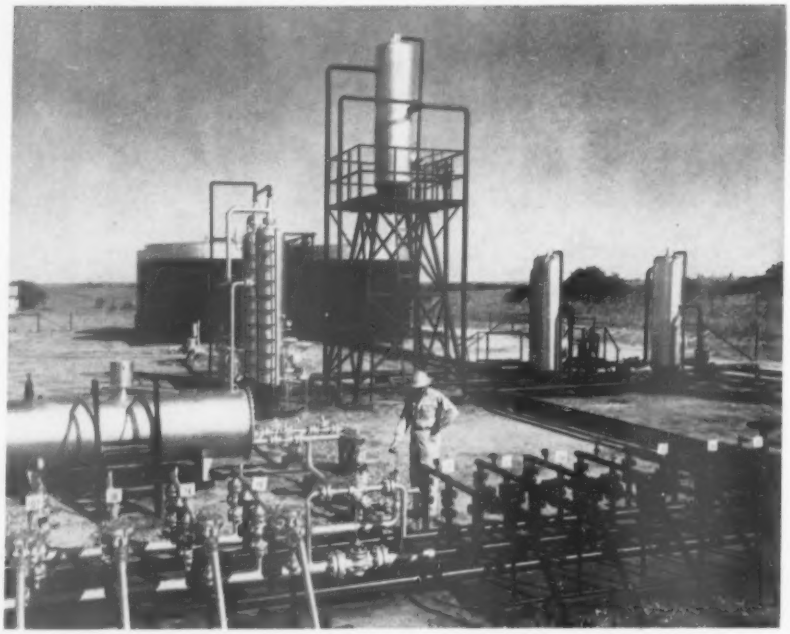
On those wells equipped for hydraulic bottom-hole pumps, the automatic shutdown valve is on the power-oil line. On beam-pumping wells, fuel gas to the engine is automatically shut off.

In case of a broken line, the resultant decrease in back pressure will actuate the low side of the automatic well head valve.

Safe, dependable pumping . . . Because many of the wells in SWAGSU are lifted with hydraulic bottom-hole pumps, each battery has its own triplex high-pressure pump to provide power oil. The power-oil system operates at 3,000 to 3,200 psi.

Experience had shown that when belt drives were used for power-oil pumping, a fire hazard was created by leakage of the high-pressure oil. A small amount of oil on the belts caused them to slip and heat; in a short time, enough heat was generated to ignite the accumulated leakage oil and cause extensive damage.

Since it is extremely difficult to eliminate oil leakage, it was decided to use hydraulic couplings for a direct drive between the gas engines and the triplex pumps. In this application the hydraulic coupling has advantages over conventional belt and clutch power transmission:



A SWAGSU tank battery. Individual well lead lines are manifolded to permit switching into high-pressure, low-pressure, testing, or wet-oil header.

1. Initial equipment investment is less.
2. Operating expense is less.
3. Fire hazard is less.

When the engine with a hydraulic coupling is to be started, a bypass around the pump may be opened until operating speed is reached, and the load applied to the engine by gradually closing the bypass.

A second potential fire hazard has been eliminated by equipping all engines at the batteries with mufflers that exhaust upward.

Water system . . . SWAGSU injects daily about 7,000 bbl. of salt water through 14 wells into the Gibson sand at an average pressure of 550 psi. The program is presently being expanded to bring the number of injection wells to 27.

Injection water is sufficiently pure to use a closed system with no chemical treatment. However, when a water line is opened for any reason, small amounts of bactericide are added; and, to date, no bacteria trouble has been reported.

Presently, all injected water is from three old wells plugged back to a 3,000-ft. sand. As the volume of produced water increases, the system will be opened to include produced water.

Natural-gas blanket . . . Water supply wells are produced with Reda pumps, and the water passes through rapid sand filters containing Anthrafilt, into surge tanks like those herewith. To prevent corrosion associated with air "breathing" into these salt water tanks, natural gas at several ounces of pressure is maintained in the vapor space. Precipitation of iron compounds from the injection water as a result of contact with atmospheric oxygen is also prevented by the gas blanket.

Gas system . . . The 66,000 M.c.f. of gas that is daily produced by the 238 SWAGSU wells is gathered by two systems, one at 500 psi. and one at 15 psi. Warren Petroleum Corp. processes the gas at its Antioch plant, compresses it to 2,200 psi., and returns it to be injected into 14 wells.

However, plant fuel requirements, and shrinkage reduce the total volume available for injection to 49,000 M.c.f. daily.

The water station in the Southwest Antioch Gibson Sand Unit. A gas blanket is kept on the tanks to prevent corrosion and precipitation of iron.

Instrumentation for Precise Fractionation

. . . of benzene and toluene

by Dr. D. J. Bergman

IN the precise fractionation of benzene from toluene and xylene, high benzene quality may be maintained by utilizing a temperature differential measuring element to position a flow controller on the column reflux. Use of a differential vapor pressure measuring element to position the flow controller may also be used successfully. In either case the measuring element should be located across a tray in the rectifying section, somewhat below the top tray, at a point of appreciable temperature gradient across the selected tray.

The aromatic cut which is used as feed to the column consists predominantly of benzene, toluene and xylene. It is in most cases obtained by U.O.P. Platforming a selected naphtha fraction and purifying the Platformer effluent by Udex extraction. The aromatics concentrate from the Udex unit is percolated through clay at elevated temperatures to insure meeting the exacting acid-wash tests for nitration-grade products.

After percolation, the benzene, toluene, and xylene cut is ready for separation by fractionation without interference from paraffin hydrocarbons of similar boiling range.

Author is associated with Universal Oil Products Co., Des Plaines, Ill. Presented at ninth annual symposium on Instrumentation for the Process Industries, Texas A. & M. College, January 27-29, 1954.

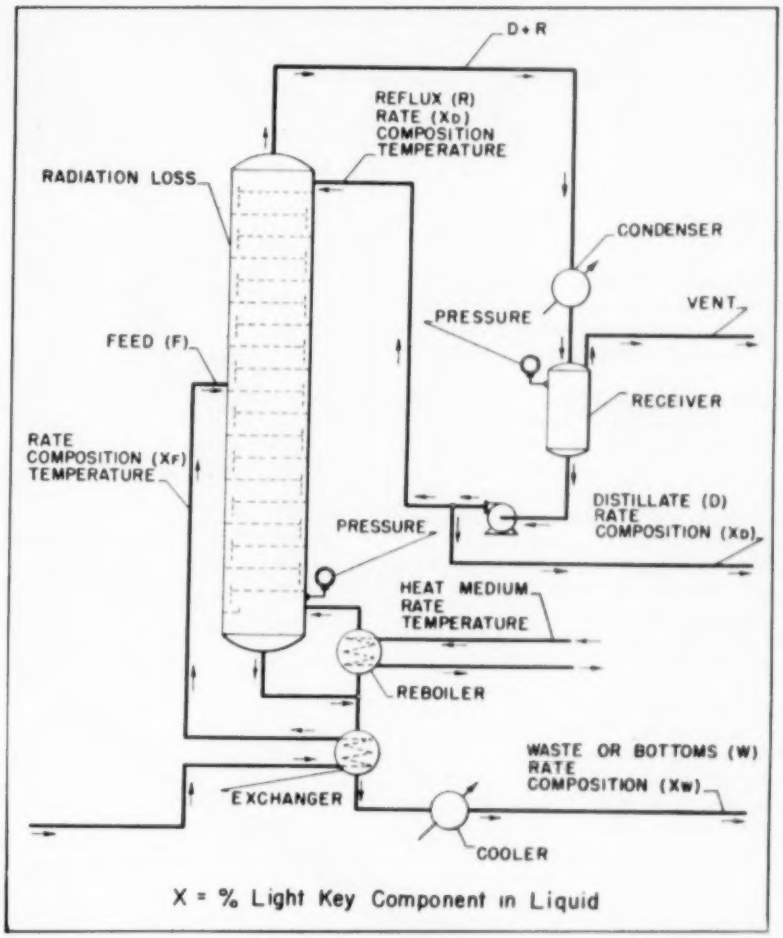


Fig. 1—Factors which must be accounted for in the combination fractionation and instrumentation problem.

Instrumentation problem . . . The factors which must be accounted for in the combination fractionation and instrumentation problem are shown in Fig. 1. There are three inputs to the tower; feed, reflux, and reboiler medium. Then there are the outputs of distillate, bottoms, reboiler medium leaving, and radiation loss. In addition we must consider the pressure, not only at the receiver, but also at the bottom of the tower.

Since this is a precise job of fractionation, storage is provided so that flow control can be applied to give a constant feed rate over reasonably long periods without necessity for adjustment. In many cases this would be provided because of alternate blocked-out operation of the Platforming unit for motor fuel and for aromatics, so intermediate storage is available to maintain a continuous charge to the aromatics fractionation.

If not, the first instrumentation problem develops with the desirability of obtaining minimum rate change from a receiver tank with a level control. Minimum variation of feed rate is essential, so if close coupling is necessary the tank should be large and the level control set to allow maximum use of storage and slow reset to normal level to minimize flow rate changes.

Composition . . . If the refinery has a single source of crude and no variation in end point is made in the Platformer charge to obtain a higher or lower yield of xylene, there will be little change in the relative percentage of the different aromatics present. But as an example of what may happen due to the end-point variation, Table 1 shows two typical feeds to the fractionation tower.

Many of the variables in this complex system can be stabilized relatively easily by means of flow control instruments, and if it were not for such assistance the problem of tower control would indeed be different.

As it is, the problem involves the various inputs and outputs, with not

TABLE 1

	A		B	
	Low E.P. Bbl.	Charge %	High E.P. Bbl.	Charge %
Benzene	125	20.1	112	11.1
Toluene	238	38.3	333	33.1
Xylene	242	39.0	487	48.4
C_9 + Aromatics	16	2.6	74	7.4
Total charge, bbl. per day	621	100.0	1006	100.0

only steady-state heat and material balances which must be exactly met, but also the transient phenomena, in which storage capacities play a large part.

Specification limitations . . . Fenske and Broughton[1] point out that to meet the nitration-grade specifications of 1° C. boiling range of benzene, less than 0.1 per cent toluene is allowable. This impurity will change the boiling temperature of the top tray only 0.035° F. from 176.2° F. the boiling point of pure benzene at constant atmospheric pressure. Alternately, when holding the temperature constant, a reduction in pressure of 0.6 mm. of mercury will result in an increase of 0.1 per cent toluene impurity.

What of the other alternative, holding the temperature constant and having an increase of pressure of 0.6 mm. of mercury? With almost pure benzene in the top of the column, the controller that tries to hold the temperature constant must cause all the vapor in the upper part of the column to condense, because it has been given an impossible job. This job is to hold a vapor-liquid equilibrium, below the boiling point of the pure benzene at the new pressure.

Points of greater temperature deviation in a column for a given limited variation of end conditions can be found below the top tray and above the bottom tray.

Such regions are located by tray-to-tray analysis of the fractionating column for different feed quality and reflux and heat conditions. This is a laborious procedure and is necessarily surrounded by simplifying assumptions, but is the only feasible scheme in the design stage.

With the plant in operation, the instrument engineer can determine these locations by measuring with thermocouples or resistance thermometers, but he must be careful in interpreting his results that the end conditions of purity of distillate and bottoms are satisfactory, that no impurity or other key component is being concentrated in the column, and that the column is not working in a transient swing from one stable condition to another.

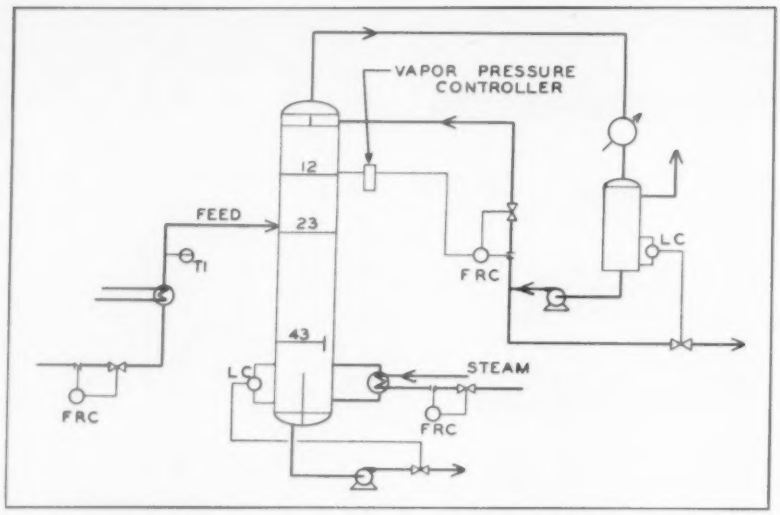


Fig. 2—Vapor-pressure-comparison method for control of reflux.

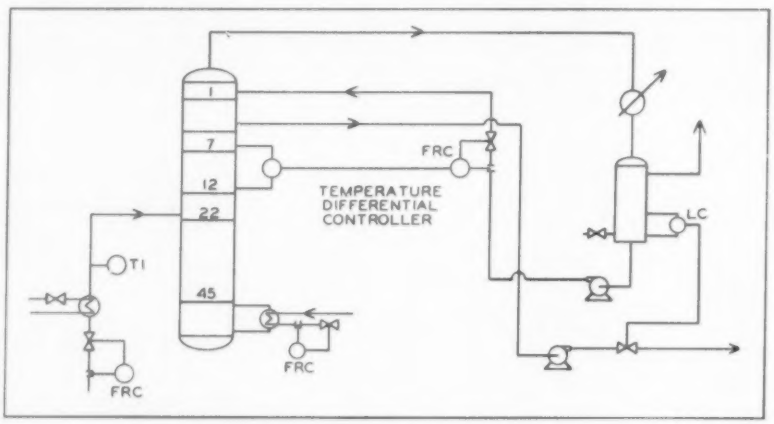


Fig. 3—Temperature differential controller on benzene column.

Temperature variation . . . Utilization of a point of higher temperature variation below the top of the column for control purposes involves some other factors. The greater the number of trays between the top of the column and the control point, the greater is the time lag between sensing a temperature variation, changing the top reflux rate in accordance, and finally sensing the effect of that change on the control point. Therefore, it appears that a compromise between maximum temperature variation, and minimum lag will usually result in picking a control point nearer the top of the column.

The criterion of whether to use the location above or below the feed point seems to depend upon the composition of the feed and also on which is the important end condition. For instance, assume a feed with 90 per cent benzene to a column. The trays above the feed point will have so little toluene in normal operation that the whole upper part of the column is working close to the boiling point of pure benzene. However, below the feed tray there is a zone where changes in overhead or bottoms purity give fairly quick and magnified response.

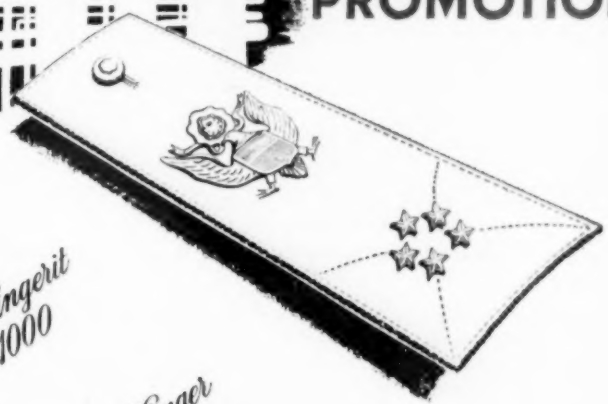
On the other hand, with 10 to 20 per cent benzene in the feed, the upper temperature-sensitive zone would be the logical one to use for reflux control, with flow of heat at the bottom held constant.

Feed composition . . . A further factor involves the composition of the feed. With a feed of benzene, toluene, and xylene to a column, the section above the feed tray has little xylene, so conditions are close to those of a binary mixture and a fairly direct relationship between temperature and composition results. Below the feed tray differences in toluene and xylene percentages result in a change in the toluene concentration on the trays, and the benzene carried down does not affect temperature so directly.

Since this 10 to 20 per cent is ap-

Klinger

FIVE STAR SHEET PACKINGS NEED NO PROMOTION



Klingerit

Universal compressed asbestos sheet packing for all purposes

Klingerit 1000

Wire – reinforced compressed asbestos sheet packing for all uses

Klinger Acidit

The finest acid resisting com – pressed asbestos sheet packing

Klinger Oilit

Especially made for use with oils and with most hydrocarbons

R△K

A good quality sheet packing for general engineering practice

Write for the Klinger Master Catalog which describes the complete range of Klinger products, compressed asbestos sheet packings for all purposes, valves, cocks, level gages, synthetic and silicone rubbers.

RICHARD KLINGER LIMITED, KLINGERIT WORKS, SIDCUP, KENT, ENGLAND

Agents throughout the World

Manufacturing Licensees for Canada

JOSEPH ROBB & COMPANY, LIMITED
5575, COTE ST. PAUL ROAD, MONTREAL, 20, CANADA
Telephone: WILBANK 3181 Cable: ROBCO
Branches at: SYDNEY, N.S., HALIFAX, N.S., OTTAWA, Ont., TORONTO, Ont., HAMILTON, Ont., WINNIPEG, Man., EDMONTON, Alta., VANCOUVER, B.C.

Manufacturing Licensees for U.S.A.

THE KLINGER CORPORATION OF AMERICA
95, RIVER STREET, HOBOKEN, NEW JERSEY, U.S.A.
Telephone: HOBOKEN 2-7915 Cable: KLINGDALE
New York Office: 17, BATTERY PLACE, NEW YORK 4, N.Y., U.S.A.
Telephone: WHITEHALL 3-8996 Cable: COFFDALE

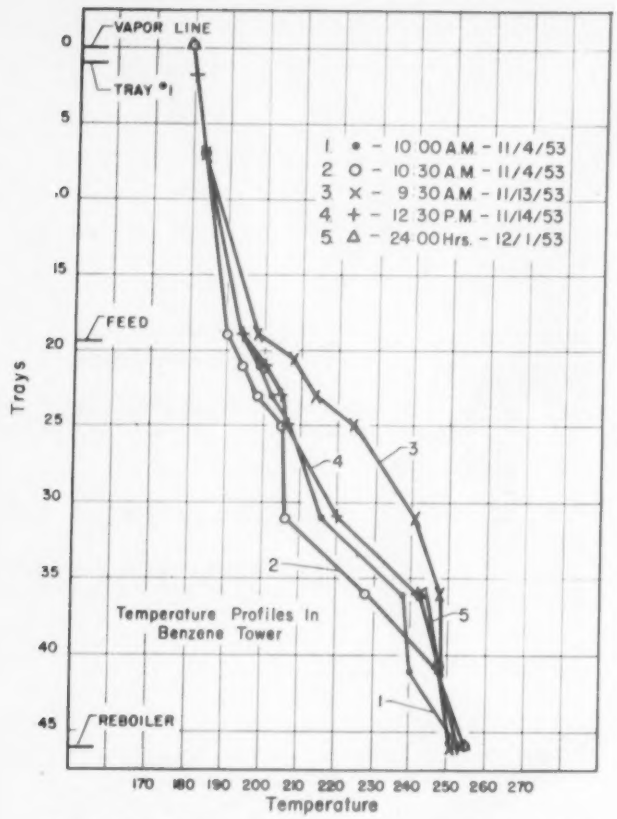


Fig. 4—Series of temperature profiles taken from benzene tower.

proximately the range of benzene in a depentanized Udex extract feed, this appears to be the logical control setup. However, because of the effect of pressure changes, either atmospheric or due to load changes, it was considered desirable to compensate for them.

A means of making this compensation is through an instrument which would compare the vapor pressure of a pure liquid in a bulb located in the liquid on a tray, with that of the vapor pressure at that point in the column. Both liquids (in the bulb and on the tray) would be at the same temperature through heat transfer except for transient periods, and the difference in vapor pressure would then be a measure of the impurity of the liquid on the tray. Changes in atmospheric pressure would not matter since the comparison is between two vapor pressures at the same temperature.

Such an instrument was installed, as shown in Fig. 2, but was found to have some deficiencies. For one thing, pure benzene freezes at a temperature of about 5.5° C. or 42° F. For another thing the particular instrument used had too large a scale, so its variation was so small that it would not have acted well as a controller. However, its indications were carefully watched and used by the operators to set flow controllers on the reflux and the reboiler heat. Results of this operation were satisfactory, with all specifications for the products being easily met.

Alternate system . . . For another plant a temperature differential correction was tried using resistance thermometers, as per Fig. 3. In this case the temperature of the liquid on tray No. 2 was taken as the comparison factor, which temperature would vary (if it were pure benzene as desired) only with variations in column pressure.

In order to rid the benzene of water of saturation, a side cut was arranged to draw dry benzene off the fourth tray. This means that concentration of water and traces of paraffins in the overhead reflux will also affect the temperature, so the comparison point was moved down. No well was available on the fifth tray but one on the seventh was used. This is lower than desirable, but enabled production of satisfactory product.

A series of temperature profiles is shown in Fig. 4, taken from the benzene tower, with the following notes pertaining to the operation. These were made with the tower on flow control of reflux and heat, to line out operation of the differential temperature controller.

1. 10 a.m.—11/4/53—Reflux 2,225 bbl. per day 40-psi. steam increased from 5,210 to 5,590 lb. per hour. Benzene make was rapidly rising, at time survey was made it was up to 463 bbl. per day and coming off side cut stream.

2. 10:30 a.m. — 11/4/53 — 40-psi. steam kept at 5,590 lb. per hour while reflux was increased to 2,400 bbl. per day. Benzene make still off side draw started to drop and was at 360 bbl. per day and still going down.

3. 9:30 p.m. — 11/13/53 — Benzene make off reflux drum tower lined out these conditions several days. Reflux down to 1,608 bbl. per day, steam lowered to 4,450 lb. per hour, and benzene make fairly constant at 406 bbl. per day.

4. 12:30 p.m.—11/14/53—Benzene make off side cut again and lined out for about a day. Steam 4,650 lb. per hour. Reflux 2,000 bbl. per day. Benzene make 386 bbl. per day. No. 36 tray slowly dropping.

From the curves it can be noted that until the column is well balanced to compare with Curve 4, low temperatures in the bottom of the tower indicate that benzene is moving downward, and high temperatures indicate that toluene is moving upward.

During the operation indicated by Curve 5 on 12/1/53, the reflux was 1,928 bbl. per day. Benzene to storage 391 bbl. per day. At this time the differential temperature controller was in operation with a total differential between the seventh and twelfth trays of 1.4° F., controlling the reflux to the column.

The benzene and toluene from their respective columns was as follows.

	Benzene	Toluene
Specific gravity	0.8825	0.8700
Freezing point	5.49° C.	
Initial boiling point	80.1° C.	110.6° C.
Dry point	80.6° C.	111.0° C.

From the boiling ranges it is obvious that purity of both benzene and toluene are well above nitration-grade specifications and the control system can be considered satisfactory.

Reference

1. E. R. Fenske and D. B. Broughton, paper presented at A.C.S. symposium on petrochemicals, Chicago, September 6-11, 1953.

"To meet the nitration-grade specifications of 1°C. boiling range of benzene, less than 0.1 per cent toluene is allowable."

How Mud Properties Affect DRILLING RATE

by John R. Eckel

Conclusions of Mud Study . . .

Based on field and laboratory observation and experiments it is believed that the effect of mud properties on drilling rate must be separated as follows:

1 Since hydrostatic pressure affects formation drillability, density is a fluid property which affects drilling rate. The research reported by Payne and Chippendale and observation of large increases in drilling rate brought about by the use of air or gas support this conclusion.

2 Since increased rates of penetration together with reductions in torque and drag are observed in the field when oil emulsion muds are used, and since the laboratory studies do not support this as an independent effect, it is believed that the increases obtained with this mud are due to its lubricating properties.

3 Fluids affect drilling rate indirectly through the influence of both density and viscosity on the hydraulic quantities involved in rotary drilling. In this connection they are significant principally because a drilling rig is essentially a constant or maximum hydraulic horsepower device, and increases in these two quantities increase system losses.

4 In addition to the above effects the fluid influences drilling rate by its cleaning effect. In this connection the significant variable which has been measured appears to be viscosity.

IN any engineering study of rotary drilling it is convenient to divide the factors which affect the rate of penetration of rotary bits into the following five groups:

1. Formation.
2. Bit.
3. Mechanical.
4. Hydraulic.
5. Fluid properties.

Formation, while nearly an independent or uncontrollable variable, is influenced to a certain extent by hydrostatic pressure. Payne and Chippendale[1] have reported results of some limited laboratory experiments which indicate that in some formations, increased hydrostatic pressure increases the formation hardness or reduces its drillability.

The bit type selected, drag, diamond, or roller cutter bit, and the various tooth structures which are available in this later type, affect to some extent the drilling rate obtainable in a given formation.

The mechanical factors of weight on the bit and rotary speed are then linearly related to drilling rate provided the hydraulic factors are in proper balance to insure proper cleaning of the hole.[2]

The hydraulic factors[3 4 5 6] affect drilling rate only as they influence the rate or efficiency with which the mechanical factors can be applied.

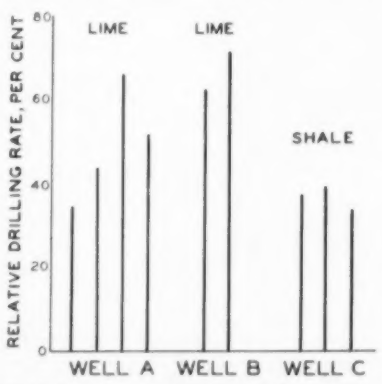
The manner in which the fifth factor affects drilling rate is the subject of this article.

Field Measurements and Observations

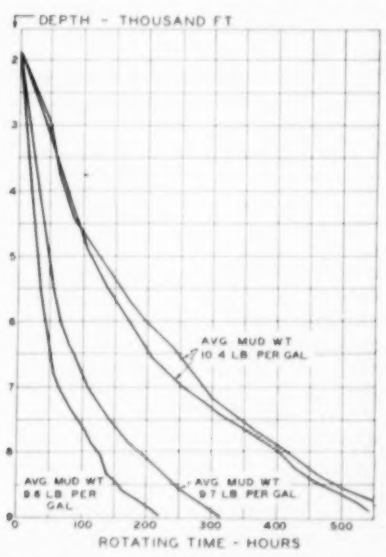
For several years, particularly in the hard-rock areas such as West Texas, field personnel have observed the reduction in drilling rate which accompanies a change from water to mud. While this phenomenon has been observed, its order of magnitude had not been the subject of detailed investigation and no fundamental information as to its cause was available. Humble's investigation of this problem began with a measurement of the relative drilling rate, that is, the drilling rate with mud as a percentage of the drilling rate obtained with water on several different wells drilling both lime and shale formations with rotary-type bits. These data were obtained by drilling alternate short sections using first mud then water as the drilling fluid. All other recognized variables were held constant during these tests.

Data such as those shown in Fig. 1 were obtained. Relative drilling rates varied from approximately 30 to 70 per cent. Data from routine field drilling where the principal variable was mud weight were obtainable as in the example shown in Fig. 2. Drilling rate appeared to vary inversely with mud weight. The same variation may be seen in Fig. 3 although in this case the hydraulic factors also varied somewhat as is shown.

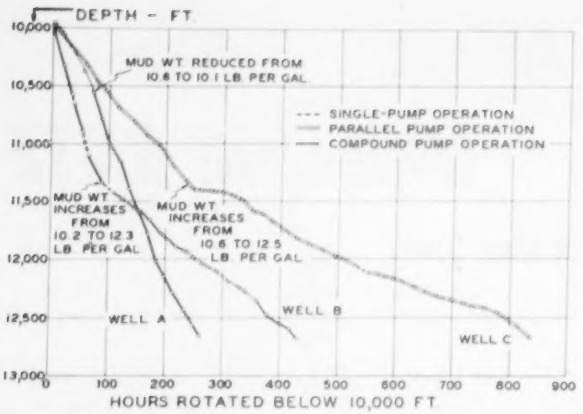
Increases in rate of penetration were obtained where oil-emulsion muds were compared with conventional muds under similar drilling conditions. An example of this comparison may be seen in Fig. 4. In addition, it was observed that the use of oil-emulsion muds re-



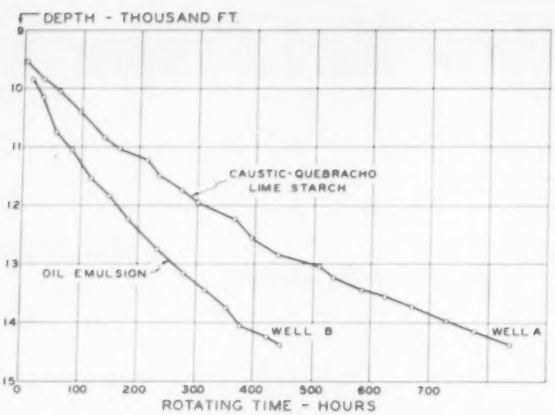
Field data showing effect of mud on drilling rate, West Texas area. (Fig. 1).



Field data showing effect of mud weight on drilling rate, South Mississippi. (Fig. 2).


DEPTH - FT.
MUD WT. REDUCED FROM 10.6 TO 10.1 LB. PER GAL.
--- SINGLE-PUMP OPERATION
PARALLEL PUMP OPERATION
COMPOUND PUMP OPERATION
MUD WT. INCREASES FROM 10.2 TO 12.3 LB. PER GAL.
MUD WT. INCREASES FROM 10.6 TO 12.5 LB. PER GAL.
WELL A
WELL B
WELL C
HOURS ROTATED BELOW 10,000 FT.

Field data showing effect of mud weight and hydraulic factors on drilling rate, South Louisiana. (Fig. 3).



Field data comparing effect of oil emulsion and conventional mud on drilling rate, South Louisiana (Fig. 4).

duced torque by as much as six turns on 5-in. o.d. drill pipe and reduced drag from 80,000 to 40,000 lb.

Further difference in drilling rate which could be attributed only to a difference in the fluid properties were obtained on wells which had used air or natural gas as the drilling fluid. A recently obtained comparison between air and mud is shown in Fig. 5. Not only was the average rate of penetration obtained with air greater, but only 2 bits were used compared with 11 bits required to drill a comparable section in an offset well.

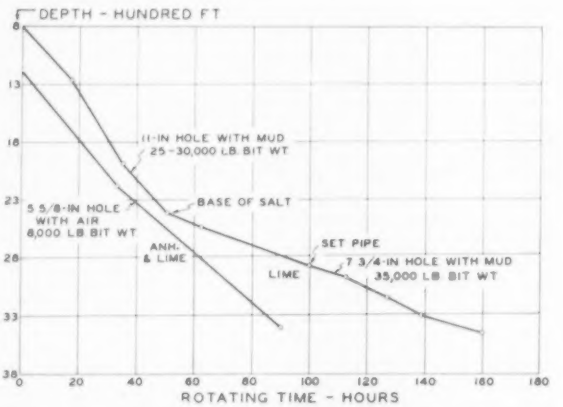
Field Tests

As a result of these field observations and measurements of the effect of mud on drilling rate, a series of field tests were conducted in the West Texas area in an effort to determine the mud property or properties responsible for this reduction. These tests were conducted while drilling a uniform lime section by pumping alternate slugs of test mud and water past the bit holding all other recognized variables constant. Data obtained from these tests are shown in Figs. 6 and 7.

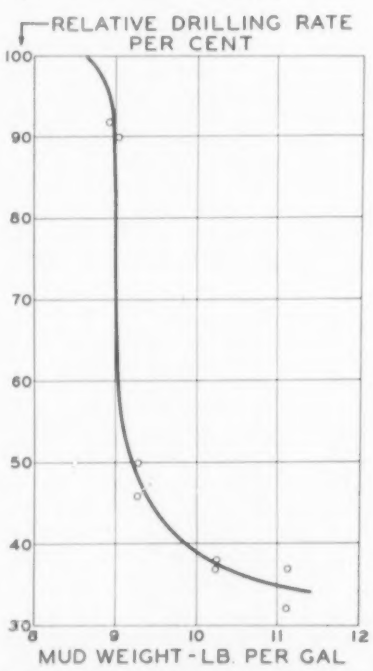
Fig. 6 shows the effect of mud weight on relative drilling rate and indicates that drilling rate is reduced as mud weight or some property proportional to mud weight is increased. The muds used on these tests were mixed from bentonite, drilling clay, and barites with various chemical treatments to vary the physical properties. Since the composition of the muds used was thus essentially the same, any property which is a function of the solids content such as density, viscosity, and to a certain extent gel and water loss would all be proportional.

Fig. 7 shows the effect of oil-emulsion concentration on drilling rate. These tests indicated that while oil-emulsion muds also caused a reduction in drilling rate compared with water-drilling rates, there was an optimum oil concentration for which the reductions in drilling rate would be a minimum. Difference shown between mechanical and soap-type emulsion is not considered significant.

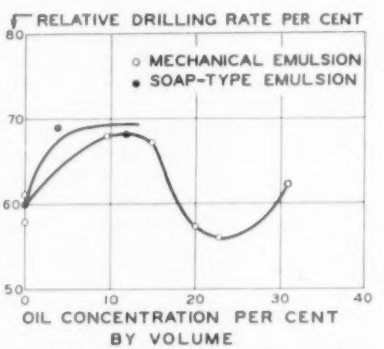
Difficulty in obtaining uniform formation in which to conduct field tests and difficulty and expense involved in


DEPTH - HUNDRED FT.
11-IN HOLE WITH MUD 25-30,000 LB. BIT WT.
5 5/8-IN HOLE WITH AIR 6,000 LB. BIT WT.
BASE OF SALT
ANH. & LIME
SET PIPE
LIME
7 3/4-IN HOLE WITH MUD 35,000 LB. BIT WT.
ROTATING TIME - HOURS

Field data comparing air and mud as drilling fluids, New Mexico. (Fig. 5).



Field test data showing effect of mud weight on drilling rate, West Texas area. (Fig. 6).



Field data showing effect of oil in emulsion concentration on drilling rate, West Texas area. (Fig. 7).

mixing different muds in sufficient quantities for 5 to 10 minutes pumping time led to a decision to determine whether or not this problem might not best be solved in the laboratory.

Laboratory Tests*

To conduct the laboratory tests a large drill press was modified by the

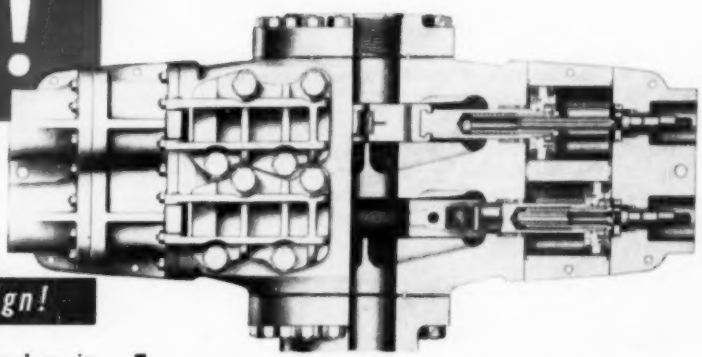
*In cooperation with Harry W. Brown, production research division, Humble Oil & Refining Co.

To get the industry's

Most Advanced
CELLAR CONTROL GATES

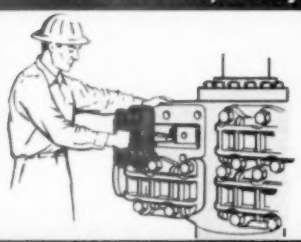
On every point essential to modern control gate protection Shaffer Hydraulic Cellar Control Gates are years ahead in design, in construction, in field-proven dependability.

SPECIFY
SHAFFER !



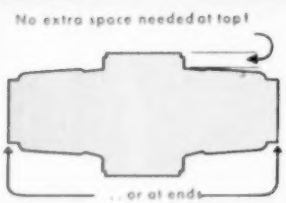
Only Shaffer Gates give you:

1. The Simplicity of Side-Door Design!



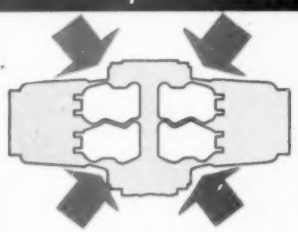
To change rams, simply open doors in the side of the Gate, replace rams, and bolt the doors shut again. It's the quickest, most convenient design available—*and it's exclusively Shaffer!*

2. Compactness that Means Something!



Side door design means that rams are changed where there's plenty of room in the cellar—alongside the Gate. There's no need to expand critical *length* dimensions—or allow extra room *above* the gate—to change rams!

3. Equal Convenience—Top or Bottom!



With Shaffer Hydraulic Double Gates there's no need to disassemble the upper unit to change rams in the lower unit. *Either* compartment can be serviced with equal simplicity—without disturbing the other compartment!

These Shaffer Advancements are important, too...

1 Completely Enclosed Design, with no exposed moving parts to become damaged or jammed.

2 Self-Draining Compartment Bottoms, with rams traveling on guide ribs, high above any detrimental mud or sand that might accumulate.

3 Direct Hydraulic Drive, without secondary connections or complicated arrangements for closing and opening the rams.

4 Choice of Double or Single Gates in all sizes—select the type that best meets your individual requirements.

REMEMBER—in addition to all their other advantages, Shaffer Hydraulic Cellar Control Gates have been field-proven by years of actual field service under widely-varying conditions. Before you invest in any cellar control gates be sure to get complete details on the industry's *most modern* gates from your Shaffer representative. Or write direct.

31 YEARS OF OIL TOOL LEADERSHIP

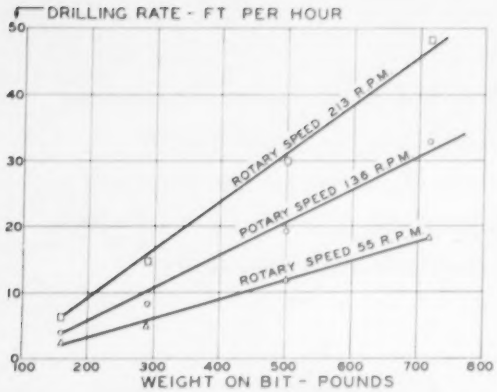
Have you a copy of the latest Shaffer Catalog? If not, we'll gladly send you a free copy.

See the Shaffer Section of your Composite Catalog.

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

SHAFFER TOOL WORKS, Brea, California • California Service Shops: Santa Fe Springs and Taft
HOUSTON, TEXAS, 6006 Navigation Blvd. • ODESSA, TEXAS, 1925 West Second Street
OKLAHOMA CITY, OKLAHOMA, Acme Oil Tool Company, 1001 S. E. 29th STREET
FARMINGTON, NEW MEXICO, Shaffer Tool Works, Post Office Box 546
CASPER, WYOMING, Shaffer Tool Works, Post Office Box 1788
EXPORT SALES OFFICE: Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y., U.S.A.

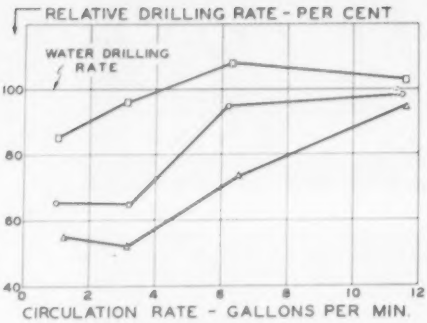


Laboratory data showing relation of drilling rate and weight on bit at constant rate of circulation and rotary speed. (Fig. 8).

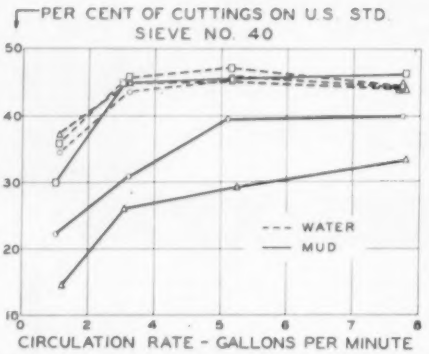
addition of a swivel arrangement to provide circulation and a drum and cable arrangement to provide uniform loading to serve as the drilling unit. A Moyno pump provided circulation at rates up to about 12 g.p.m. at pressures up to 500 psi. The roller bit used in the experimental work was of a two-cone design manufactured for this purpose by one of the major bit-manufacturing companies. The formation drilled consisted of 8-in. cubes of Lueders limestone available from a local stone company.

It was first necessary to determine whether or not laboratory drilling was at least in qualitative agreement with the field results. Fig. 8 shows the effect of weight and rotary speed at constant rates of circulation on the drilling rate obtained in the laboratory. Since these data are qualitatively similar to those obtained from field experiments, it may be assumed that the mechanical factors affect drilling rate similarly in both the laboratory and the field.

To determine whether the effect of mud which has been found in the field could also be measured in the laboratory, data such as those shown in Fig. 9 were obtained. It will be noted that at least in the region below a circulating rate of 4 g.p.m. in the laboratory, a reduction in drilling rate was obtained with mud. The question of scaling the results was postponed by a decision to work with trends and minimum reduction and then to field test the results of the laboratory study.



Laboratory data showing relation of drilling rate and circulation rate for three different muds. (Fig. 9).



Laboratory data showing effect of circulation rate on cutting recovery for three muds and water. (Fig. 10).

Using a wide variety of muds and solutions, results such as are shown in Fig. 9 were obtained. Since the maximum reduction in drilling rate with mud was obtained generally in the region of 3 g.p.m. circulating rate this volume was arbitrarily selected for comparing the effects of various fluids and properties. A standard bit weight of 500 lb. and a rotary speed of 55 r.p.m. were also arbitrarily selected.

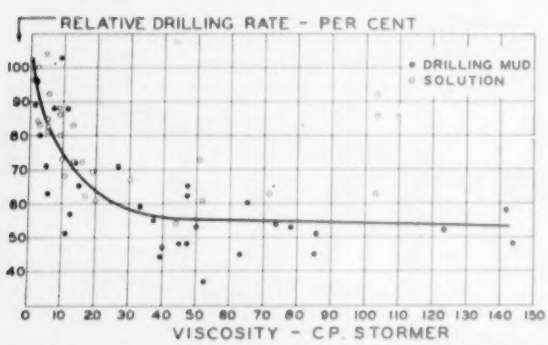
In addition to drilling-rate data, the following mud properties were measured where pertinent:

1. Density.
2. Viscosity (Stormer and Marsh funnel).
3. Filtration (30 minutes A.P.I.).
4. Gel (initial and 3 minutes).
5. Per cent solids by weight (obtained by drying a mud sample).
6. Per cent solids by volume (obtained by centrifuging a mud sample).

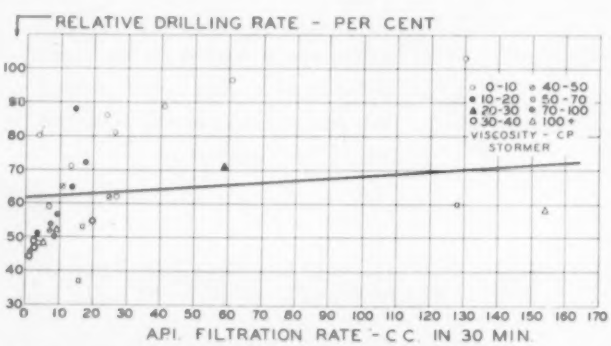
The amount of cuttings which were retained on U. S. Standard Sieve No. 4 was also measured. The cutting recovery data which are shown in Fig. 10 were found to be quite similar in

THE AUTHOR

John R. Eckel has been engaged in drilling research work since his return in 1949 to Humble Oil & Refining Co., Houston, after having left that company in 1948 to do graduate work in electrical engineering at Rice Institute. He finished with a B.S. degree. Eckel was born in 1922 in Colorado. He served from 1944 until 1946 in the Signal Corps, and was employed by the Army Intelligence in Germany for 2 years. He then returned to the United States and was employed in his present capacity.



Laboratory data showing effect of viscosity on drilling rate. (Fig. 11).

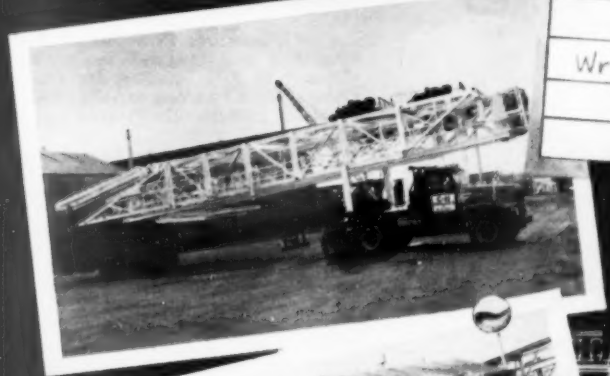


Laboratory data showing effect of filtration rate on drilling rate. (Fig. 12).

Lee C. Moore TWO-TRAILER MAST (Heavy Duty)

RIGIDLY SPLICED TOGETHER WITH DRIVE PINS

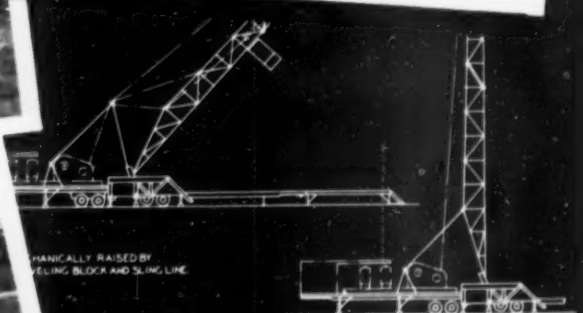
TOP SECTION EXTENDED AND GIN POLES RAISED BY DRAWWORKS POWER LEGS IN TRUE ALIGNMENT POSITIVE PIN SPLICES WITHOUT LEG OVERLAP



EASY TO TRANSPORT-
EASY TO ERECT-
EASY TO MOVE-

One trailer carries MAST SUB-STRUCTURE, PART OF WALK WAY, and ROTARY TABLE. Other trailer holds DRAW WORKS and POWER. This two trailer rig permits better weight distribution, which enables a higher capacity mast and larger draw works and power to be used.

Write for COMPLETE INFORMATION



MANICALLY RAISED BY ELING BLOCK AND SLING LINE

SELF SUPPORTING WITHOUT GUYS – HOOK CAPACITY 225,000*

LEE C Moore CORPORATION

TULSA • DALLAS • HOUSTON • MIDLAND • SHREVEPORT • WICHITA • CENTRALIA • PITTSBURGH
Export Office — Room 624, International Bldg., 630 5th Ave., New York 20, N. Y.

form to the drilling-rate data shown in Fig. 9. This similarity is believed indicative of the manner in which the drilling fluid retards drilling rate, that is, by a direct effect on the amount of regrinding which takes place at the bit.

The relative drilling rate obtained under the arbitrary conditions of 3 g.p.m. circulating rate, 500 lb. bit weight, and 55 r.p.m. rotary speed was then plotted as a function of the various fluid properties. Fig. 11 shows such a plot as the function of Stormer viscosity. It will be noted that the maximum reduction in drilling rate is obtained at a viscosity of approximately 40 cp. Further increases in viscosity appear to have no effect on drilling rate.

There is some scatter in the data which is due, at least in a large measure, to the varying drillability in the most uniform rock which could be obtained for laboratory study. This variation was obtained even though the rocks used were selected for uniformity and a drilling pattern which would average out any linear variations in drillability of the sample was utilized. Graphical elimination of the apparent effect of all of the other variables measured does not appreciably reduce this scatter. Another possibilily is the influence of some factor which has not been recognized or which could not be measured.

Fig. 12 shows a plot of drilling rate as function of the standard A.P.I. 30-minute filtration rate. The apparent trend of increased drilling rate with increased filtration rate is found to be due to the extremely low viscosity of the high - filtration - rate fluids which were used. When these data are corrected using the viscosity effect shown in Fig. 11, this trend disappears indicating that any conclusions based on filtration rate must at least also consider the effect of viscosity. The results shown in Fig. 12 are typical of those for the other fluid properties.

The separate effect which had been noted in the field due to oil in emulsion concentration was not independently apparent in the laboratory, that is, oil in emulsion concentration was not a significant variable independent of viscosity. It must also be kept in mind that in the laboratory tests, wall friction was not a factor affecting drilling rate.

References

1. "Hard Rock Drilling," by L. L. Payne and W. Chippendale, Hughes Tool Co., Rocky Mountain District Spring Meeting, A.P.I. Division of Production, Casper, Wyo., May 7-8, 1953.
2. "A Preliminary Evaluation of Factors Controlling Rate of Penetration in Rotary Drilling," by J. E. Brantley and Edgar E. Clayton, Ninth Mid-Year Meeting, American Petroleum Institute, New Orleans, La., May 17, 1939.
3. "Factors Affecting the Rate of Penetration of Rock Bits," by W. J. Bielstein and George E. Cannon, The Oil and Gas Journal, March 30, 1950, page 102.
4. "The Relation of Nozzle Fluid Velocity to Rate of Penetration with Drag-Type Rotary Bits," by J. P. Nolley, George E. Cannon, and Douglas Ragland, The Oil and Gas Journal, May 6, 1948, page 87.
5. "An Analysis of Hydraulic Factors Affecting the Rate of Penetration of Drag-Type Rotary Bits," by John R. Eckel and J. P. Nolley, Humble Oil & Refining Co., Spring Meeting of Southwestern District, A.P.I. Division of Production, Galvez Hotel, Galveston, Tex., March 9-10-11, 1949.
6. "Nozzle Design and Its Effect on Drilling Rate and Pump Operation," by John R. Eckel and W. J. Bielstein, Humble Oil & Refining Co., Spring Meeting of Southwestern District, A.P.I. Division of Production, Beaumont, Tex., March 7-8-9, 1951.

Natural-Gas Expansion

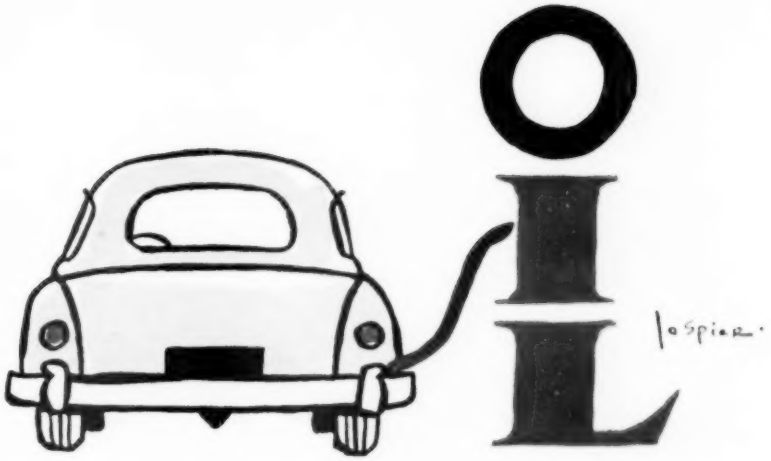
With the rapid spread of natural-gas transmission systems into new areas and with additional lines into areas already receiving natural gas, the gas-utility industry is adding gas house-heating customers at a rate of nearly 1,200,000 a year. It is estimated that by 1956, the industry will serve more than 16,100,000 dwelling units with gas house heating. This means that one out of every three dwelling units in the nation will be using gas for space heating.

PREVENT
costly damage
to "sick" engines

USE THIS
PENN
SAFETY
CONTROL

At the first symptoms of a "sick engine" . . . over-heated cooling water or lube oil pressure failure . . . this Penn Control snaps into action and tells you that a "doctor" is needed! It will sound an alarm, flash a warning light, or stop the engine operation . . . *whichever you choose.* Then, you can investigate and correct the trouble before costly damage is done! Learn more about this low-cost engine protection. Write **Penn Controls, Inc., Goshen, Indiana.** Export Division: 13 E. 40th Street, New York 16, N. Y., U.S.A. In Canada: Penn Controls Limited, Toronto, Ontario.

PENN
AUTOMATIC CONTROLS
FOR HEATING, REFRIGERATION, AIR CONDITIONING, GAS APPLIANCES, PUMPS, AIR COMPRESSORS, ENGINES



OIL MEANS MILES

The family car . . .

the modern bus . . . the

diesel train . . . depend on oil

to speed them along mile after mile.

Speed in the oil fields saves valuable rig

time . . . the simultaneous recording of all

curves permits Schlumberger to immedi-

ately deliver complete electrical log

prints in the field.

. . . and Schlumberger means Service

Schlumberger Well Surveying Corp. • Houston, Texas

Chicks from the pipeline?

IN THE MIDDLE EAST a new pipeline is laid. In a western farmyard a healthy young chick emerges from its shell.

The connection? Oil, which still heats many an incubator; and Anglo-Iranian, which produces and ships something like 600,000 barrels of oil a day. From twelve Anglo-Iranian refineries in seven countries pour the life-giving, life-easing products of oil. They are shipped in one of the largest privately-owned tanker fleets to speed development and smooth the path of progress in many parts of the world. Anglo-Iranian ranks high among the world's leading oil companies.

THE BP SHIELD IS THE SYMBOL OF THE WORLD-WIDE ORGANISATION OF

Anglo-Iranian Oil Company

LIMITED

. . . Effect of Pressure on Various Properties of Mid-Continent Naphtha

Figs. 1-5

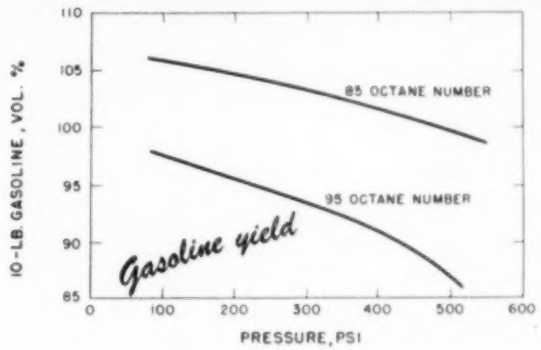


Fig. 1.

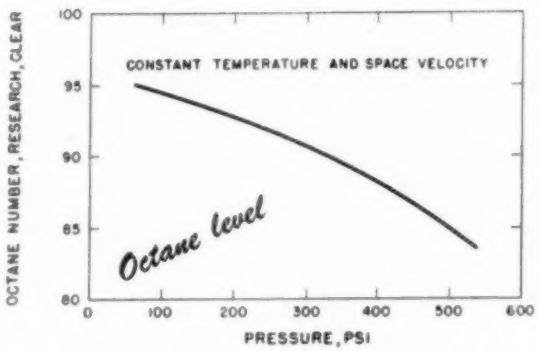


Fig. 2.

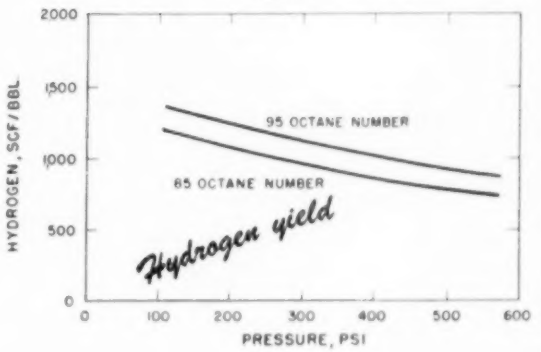


Fig. 3.

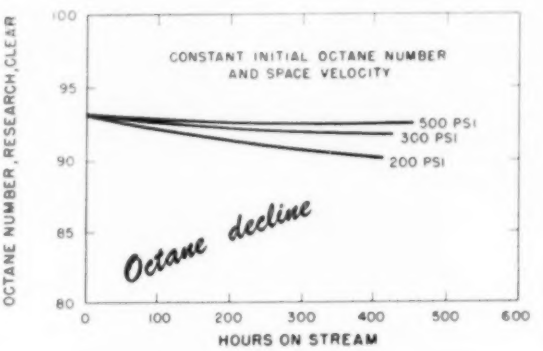


Fig. 4.

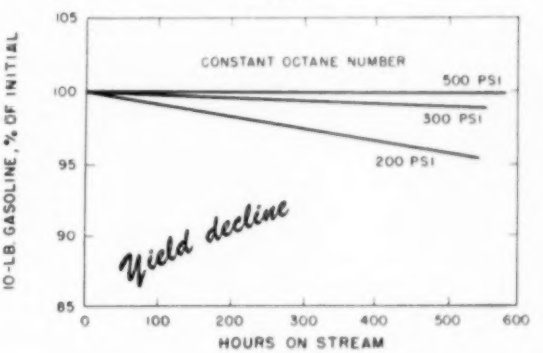


Fig. 5.

A new low-pressure catalytic reforming process . . .

ULTRAFORMING . . . *a Standard of Indiana development*

by J. H. Forrester, A. L. Conn, and J. B. Malloy

THE demand for gasoline of higher and higher octane number has caused a search for better reforming processes. One approach led to continuous reforming with platinum-on-alumina catalysts.[1] Platinum catalysts lose activity much more slowly than molybdena catalysts. If reforming is carried out at sufficiently high pressure, platinum can be used for months without regeneration. Typical continuous reforming processes operate at pressures of 500 psi. or more.

These high pressures prevent taking full advantage of the possibilities of

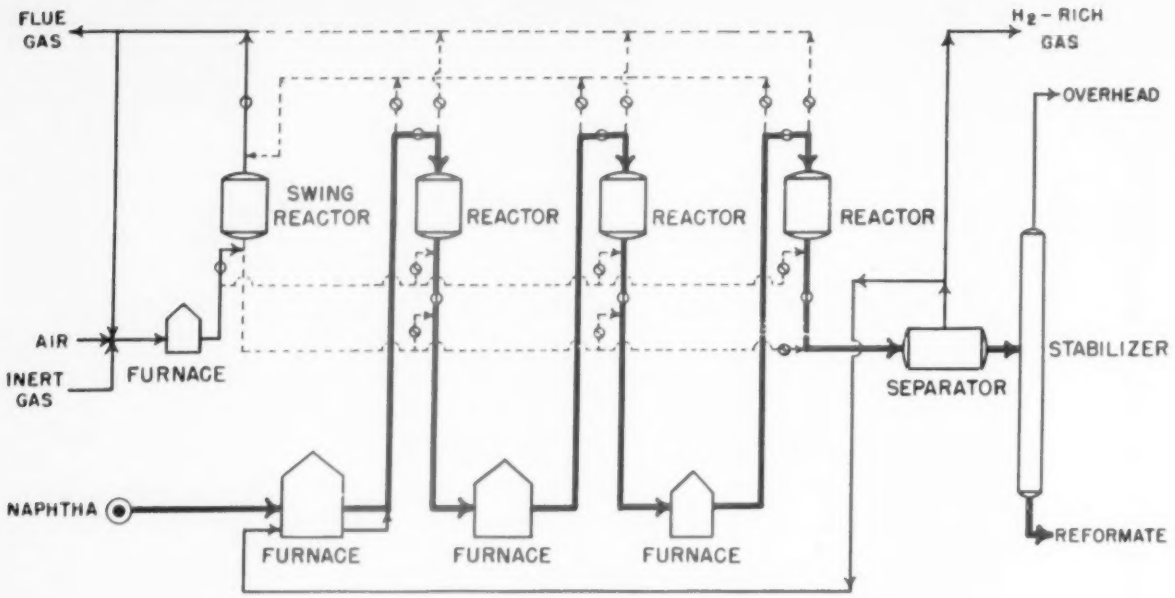


Fig. 6—Flow diagram of Ultraforming process.

platinum catalysts. Work in the laboratories of Standard Oil Co. (Ind.) has therefore been directed toward reforming at low pressure.

Reforming at Low Pressure

The pressure at which reforming is carried out affects gasoline yield, attainable octane level, hydrogen production, and rate of catalyst deactivation. Gasoline yields will be expressed here as volume per cent of C_5+ reformate plus enough butane to bring the Reid vapor pressure to 10 lb. Octane numbers will be reported by the research method and without tetraethyl lead.

Lower pressure gives higher gasoline yield, particularly at high octane levels. This effect is illustrated in Fig. 1. At the 85-octane level, gasoline yield increases about 3.5 per cent when pressure is reduced from 500 to 300 psi. Further reduction to 200 psi. increases yield another 1.5 per cent. At the 95-octane level, the effect of pressure is even greater; the corresponding increases are 7 per cent and 2 per cent.

The improved yield results from less hydrocracking at lower pressure. Not only is the yield of C_5+ reformate higher, but its vapor pressure is lower and more butanes can be added to give 10-lb. gasoline. The advantage of low-

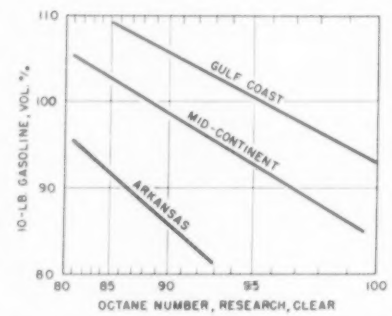


Fig. 8—Gasoline yields from different naphthas.

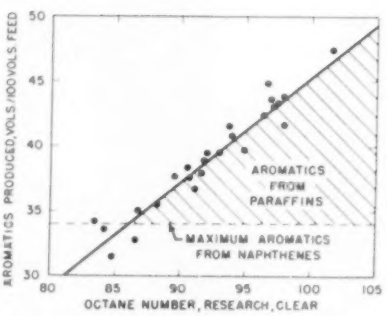

AROMATICS PRODUCED, VOLS./100 VOLS. FEED
AROMATICS FROM PARAFFINS
MAXIMUM AROMATICS FROM NAPHTHENES
OCTANE NUMBER, RESEARCH, CLEAR

Fig. 9—Aromatics production in Ultraforming, Mid-Continent naphtha.

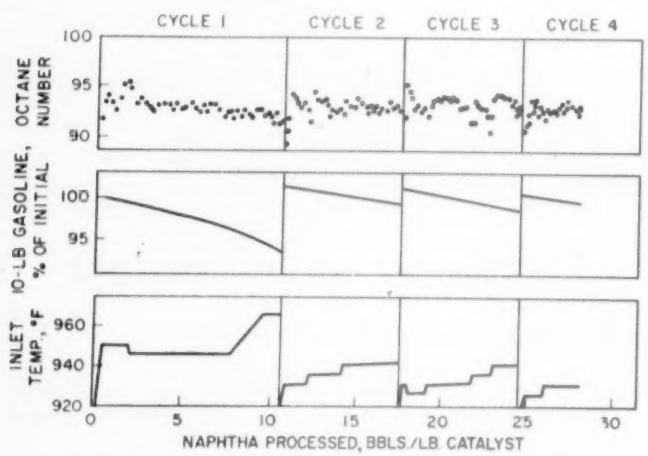


Fig. 7—Typical Ultraforming operation, Mid-Continent naphtha.

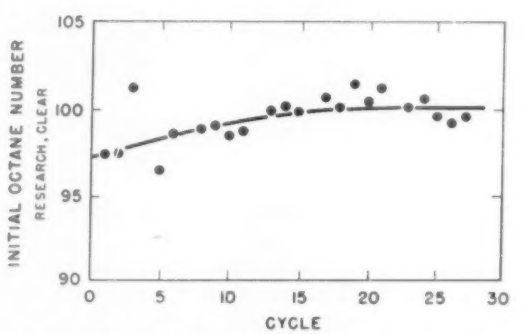


Fig. 10—Accelerated aging of Ultraforming catalyst, Mid-Continent naphtha.

THE AUTHORS

J. H. FORRESTER

Jay H. Forrester is manager of research for the Standard Oil Co. (Indiana). He joined Standard Oil in 1929. In 1946 he was transferred to Stanolind Oil & Gas Co. and in 1952 returned to Standard, in his present capacity. During World War II, Forrester served on a number of industry committees concerned with the toluene and aviation-gasoline programs. He is a member of a number of technical societies.

A. L. CONN

J. B. MALLOY

A. L. Conn is director of the pilot-plant division in the research department of Indiana Standard. Conn joined the company in 1939, and became director of the pilot-plant division in 1950. Prior to his association with Indiana Standard he was associated with Blaw-Knox Co., Alco Products division of the American Locomotive Co., and with the M.I.T. school of chemical engineering practice.

J. B. Malloy joined Indiana Standard in 1951 and is a chemical engineer in the pilot-plant division. Malloy studied at M.I.T., where he received his B.S. degree in 1950 and M.S. degree in 1951.

This paper was presented at the W.P.R.A. annual meeting, San Antonio.

pressure operation may perhaps be more readily visualized by considering a plant operation at constant pressure in which it becomes necessary to increase octane number from 85 to 95. At 500 psi. the octane number increase would result in a yield loss of 13 per cent; at 200 psi. the yield loss would be only 9 per cent.

Lower pressure also makes it practical to attain higher octane levels with a given naphtha. This advantage is evident from Fig. 2, in which octane level is shown as a function of pressure with other process conditions held constant. Octane level can be increased from 85 to 93, for example, by decreasing pressure from 500 to 200 psi. Lower pressures permit high octane numbers without resorting to unduly severe reforming and incurring prohibitive losses in gasoline yield.

More hydrogen . . . Low-pressure operation results in better yields of hydrogen, a valuable byproduct of catalytic reforming. In Fig. 3, hydrogen production in standard cubic feet per barrel is shown as a function of pressure for a Mid-Continent naphtha. At the 95-octane level, hydrogen production increases by 210 standard cu. ft. per barrel upon reducing pressure from 500 to 300 psi. An additional increase of 110 cu. ft. per barrel results from further reduction of pressure to 200 psi. The increased hydrogen yields are due both to increased production from dehydrogenation reactions and reduced consumption by hydrocracking.

As the pressure is lowered, platinum catalysts accumulate coke faster and hence deactivate faster. A more rapid decline in octane number results. In Fig. 4 the decline is shown for operations at 200, 300, and 500 psi. in which temperature is adjusted to give the same initial octane number. At high pressure, the decline rate is low enough to permit continuous reforming. At low pressure, octane declines more rapidly and continuous reforming is no longer possible.

Yield decline also is more rapid at lower pressure. In Fig. 5, the decline in gasoline yield is illustrated at pressures of 200, 300, and 500 psi. for operations in which temperature is gradually increased to maintain constant octane number. To compensate for the more rapid octane and yield decline, regeneration is required. The problem of successfully regenerating platinum catalysts has been the principal deterrent to the commercialization of low-pressure reforming.

This problem has been solved by a new catalyst and a novel regeneration technique in the Ultraforming process. Ultraforming catalyst contains 0.6 per cent platinum on an alumina support. The regeneration goes beyond mere removal of coke; it completely restores the catalyst to fresh condition.

The Ultraforming Process

A flow diagram of the Ultraforming process is shown in Fig. 6. Naphtha feed and a hydrogen-rich gas are passed through a furnace and heated to 900°-950° F. The naphtha and gas are then passed over platinum catalyst in a series of reactors where the naphtha is upgraded to high-octane reformate. The predominant reactions are endothermic and cause a large drop in temperature across each reactor. Reheat furnaces are therefore provided between reactors. Effluent from the final reactor is condensed and separated into a liquid stream and a hydrogen-rich gas. The liquid is stabilized and withdrawn as finished reformate. Most of the gas is recycled with fresh naphtha charge; the off gas can be used as a source of hydrogen or as fuel.

To allow continuous naphtha processing, use is made of a swing reactor. As the catalyst in any reactor loses activity, that reactor is isolated from the naphtha-processing system and regenerated, employing air and inert gas. Its place is temporarily taken by the swing reactor, which contains regenerated catalyst. In Fig. 6, the swing reactor is being regenerated and naphtha is being

TABLE I—ULTRAFORMING OF DIFFERENT NAPHTHAS

	Gulf Coast		Mid-Continent				Arkansas	
FEED:								
A.S.T.M. distillation, °F.:								
I.b.p.	202		206				149	
10 per cent	250		237				172	
50 per cent	305		274				244	
90 per cent	356		324				322	
End point	394		361				377	
Composition, vol. per cent:								
Paraffins	26.0		50.0				77.0	
Naphthenes	55.5		41.5				15.0	
Aromatics	18.5		8.5				8.0	
Octane No., research, clear	59.4		44.5				45.3	
PRODUCTS:								
Pressure, psig.	300		200		300		300	
C_5+ reformate:								
Octane No., research, clear	90	100	85	95	85	95	85	90
Yield, vol. per cent	91.8	83.8	90.5	84.1	89.9	82.8	84.5	80.0
R.v.p., psig.	2.0	3.3	2.1	2.6	2.4	2.8	5.4	6.0
Butanes, vol. per cent	2.7	6.2	2.0	4.4	3.1	5.5	7.1	9.3
Dry gas, wt. per cent	3.4	7.2	3.3	6.7	4.8	8.4	7.5	9.8
Hydrogen, s.c.f./bbl.	900	1,100	1,080	1,260	970	1,150	540	590
10-lb. gasoline:								
Octane No., research, clear	90	100	85	95	85	95	85	90
Yield, vol. per cent	105.7	93.2	104.5	95.2	103.1	93.3	91.8	85.7

processed in the other three. The frequency of regeneration depends on the reforming severity and the type of feed.

Regeneration . . . The ability to restore Ultraforming catalyst completely to fresh quality gives the process flexibility. A broad range of operating conditions can be used; naphthas varying widely in character can be reformed successfully. Thorough regeneration also provides insurance against permanent catalyst damage from operational upsets. During pilot-plant operations, Ultraforming catalysts have been subjected to reforming temperatures as high as 1,130° F., to pressures as low as atmospheric, to periods without hydrogen recycle, and to feeds boiling as high as 540° F. Although deactivation was severe in each case, activity was completely restored by the regeneration technique.

Typical Ultraforming operation is illustrated in Fig. 7. Octane number, gasoline yield relative to that with fresh catalyst, and temperature used to maintain constant octane number are shown as functions of the amount of naphtha processed. These data were obtained in a pilot-plant test to demonstrate commercial reforming of a 206°-361° F. Mid-Continent naphtha to the 93-octane level.

The operation was carried out at 300 psi. and 1.5 volumes of liquid per hour per volume of catalyst. The first cycle was extended to determine how long reforming should be carried out before regenerating. Subsequent cycles were ended when gasoline yield declined 2 per cent below the fresh catalyst level.

The effectiveness of the regeneration technique is also shown in Fig. 7. Catalyst activity actually increased a little with each regeneration. Gasoline yield was restored to the level obtained with fresh catalyst. Yield declined in each cycle, but the rate of yield decline remained constant from one cycle to the next. This test has covered 7 months of naphtha processing and is still in progress. During this period, 30 bbl. of naphtha per pound of catalyst have been processed without any sign of catalyst deterioration.

Yield and Product Quality

As in all reforming processes, yields and octane levels in Ultraforming depend on the type of feed. Gasoline yields from three naphthas of high, moderate, and low naphthene content are shown in Fig. 8. From a Gulf Coast naphtha containing large amounts of naphthenes, 100-octane gasoline can be obtained in 93 per cent yield. A Mid-Continent naphtha containing moderate amounts of naphthenes yields 93 per cent of 95-octane gasoline. An Arkansas naphtha low in naphthenes yields 86 per cent of 90-octane gasoline. The complete yield data for these three naphthas are presented in Table 1.

Platinum catalysts have good activity for the conversion of naphthenes to aromatics. But even complete naphthene conversion is not sufficient to produce the high-octane fuels projected for the future. An effective catalyst must also be able to convert paraffins to aromatics. Ultraforming is particularly well suited for this conversion, because of the high activity of the catalyst and the favorable equilibria at low pressure.

The ability of Ultraforming catalyst to produce aromatics from paraffins is illustrated in Fig. 9, in which aromatics production is shown as a function of octane number for a Mid-Continent naphtha containing 40 per cent naphthenes. Conversion of all the naphthenes in 100 volumes of this feed would yield 34 volumes of aromatics in addition to those originally present. The reformate would have an octane number of 86.

Analysis of many reformates higher than 86 octane number showed that more aromatics were produced than could be obtained from the naphthenes in the feed. These extra aromatics, represented by the shaded area, must come from paraffins. Actual conversion of paraffins to aromatics is somewhat higher than shown because naphthenes are not completely converted.

Catalyst Life

The life of a reforming catalyst is best expressed in terms of the amount of naphtha that can be processed per pound of catalyst. It depends on the amount of naphtha that can be processed in each cycle and on the number of cycles the catalyst can be used. Both factors have been studied to determine the life of Ultraforming catalyst.

The amount of naphtha processed per cycle depends on how rapidly catalyst activity and gasoline yield decline in each cycle. Both decline more rapidly at lower pressure, at higher octane level, or when a higher-boiling feed is used. In the demonstration run shown in Fig. 7, a 2 per cent yield decline allowed a cycle length of 5.6 bbl. per pound of catalyst, or 40 days, at 300 psi.

The number of cycles depends on how many times catalyst quality can be restored by regeneration. This has been studied in an aging test in which catalyst deactivation is accelerated by reforming at a pressure of only 100 psi. Catalyst is regenerated after each cycle. The octane number at the beginning of each of 27 successive cycles is given in Fig. 10.

These data show no decline in catalyst activity from cycle to cycle; in fact, initial activity actually improved somewhat before reaching a constant level.

Test results . . . The demonstration run and the accelerated-aging test show that 5.6 bbl. per pound per cycle can be processed under fairly severe reforming conditions for well beyond 27 cycles. Life of Ultraforming catalyst at 300 psi. should therefore be well beyond 150 bbl. per pound.

At 200 psi., less naphtha can be processed per cycle and catalyst life depends more on the number of cycles that can be run. A test similar to the demonstration run has shown that 1.4 bbl. per pound can be processed at the lower pressure. Catalyst life at 200 psi. should therefore be well beyond 40 bbl. per pound. The accelerated-aging test is being continued in an effort to find the practical limit.

Like other platinum catalysts, Ultraforming catalyst deactivates more rapidly with feed stocks of higher sulfur content. The rate of deactivation depends not only on the amount of sulfur in the feed but also on the process conditions needed to reach the desired octane level. Ultraforming regeneration is usually sufficient to compensate for the deactivation caused by sulfur. If the feed has a high sulfur content and if operation at a high octane level is anticipated, sulfur removal may be advisable.

Because of the long life of Ultraforming catalyst, the cost in cents per barrel will be small. Including a credit for the platinum contained in spent catalyst, replacement costs will be about $4 per pound. For operation at 300 psi. the catalyst should therefore cost less than 4 cents per barrel—no more than cracking catalysts.

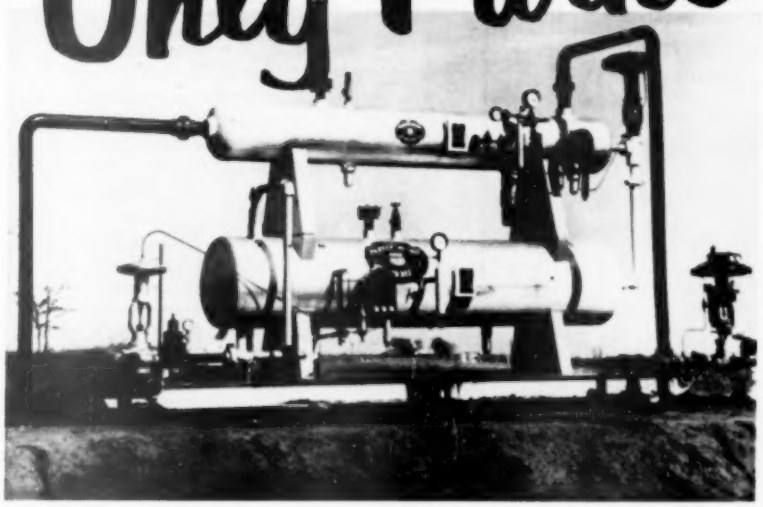
Three Ultraforming units are under construction: a 9,000-bbl. per day unit for Standard Oil Co. (Ind.) at Wood River, Ill.; a 6,800-bbl. per day unit for Pan-Am Southern Corp. at El Dorado, Ark.; and 21,000-bbl. per day unit for Pan American Refining at Texas City, Tex. Other units totaling 17,800 bbl. per day are being designed for Standard at Casper, Wyo., and Sugar Creek, Mo.

Ultraforming is available to refiners for a reasonable royalty. The catalyst will be supplied by American Cyanamid Co., which is now completing facilities for large-scale production.

Other Articles on This Subject

1. Kastens, M. L., and Sutherland, R., Ind. Eng. Chem., 42, 582 (1950).
2. Haensel, V., and Sterba, M. J., Advances in Chemistry Series, 5, 60 (1951).
3. Hill, L. R., Vincent, G. A., and Everett, E. F., Trans. Am. Inst. Chem. Eng., 42, 611 (1946).

Only Parkersburg...



SINGLE-TUBE HORIZONTAL SEPARATORS...

have these BASIC ADVANTAGES and PLUS FACTORS

They mean MORE Efficient Separation, BETTER Performance!

It's the single-tube design of Parkersburg Horizontal Separators that makes these advantages and factors possible . . . that makes the Parkersburg Horizontal Separator a far better buy than comparably priced and rated two-tube designs. Ask your Parkersburg Representative for factual proof about the superior performance and service of Parkersburg Single-Tube Horizontal Separators.

BASIC ADVANTAGES

LONGER RETENTION TIME

A greater volume of oil retained for a longer period of time in the single tube has more opportunity to evolve the maximum amount of gas.

GREATER FLOW AREA

The greater flow area in the natural separation space slows the velocity of the gas stream and allows gravity to extract more liquid droplets from the stream.

GREATER INTERFACE AREA

Due to increased interface surface, the liquid has a greater opportunity to give up the maximum amount of gas, quickly and without contribution to foam build-up.

PLUS FACTORS

LESS FREEZING TROUBLE

In the single-tube separator the liquid is always in contact with, and warmed by, the full stream of warm gas. The hazard of freezing is greatly minimized.

EASIER CLEANING

There is only one tube to clean and it has three drains instead of one. There are no internal obstructions along the bottom of the tube.

TWO-STAGE UNITIZED ASSEMBLY

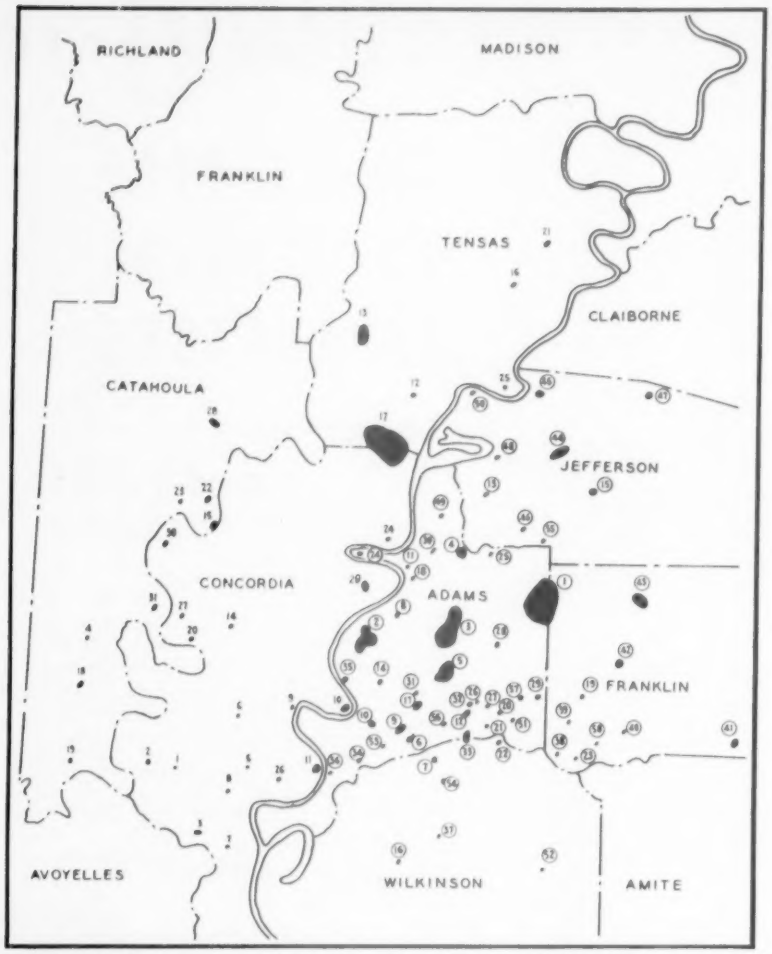
A standard high-pressure separator can be mounted on top of a low-pressure separator to give you a highly efficient, compact, unitized two-stage separation unit. The separators can be used individually simply by breaking down the assembly. An assembly of this type is shown in the accompanying illustration.

PARKERSBURG
OIL FIELD EQUIPMENT

5411

The Parkersburg Rig & Reel Co. Parkersburg, West Virginia
Division of Parkersburg-Aetna Corporation

HORIZONTAL AND VERTICAL SEPARATORS • HYRECO • KNOCKOUTS • SCRUBBERS • TREATERS • HEATERS



PRODUCING FIELDS in the Natchez area of southwestern Mississippi and eastern Louisiana. (Fig. 1).

LEGEND OF FIELDS

Southwest Mississippi

1. Cranfield
2. Carthage Pt.
3. La Grange
4. Pine Ridge
5. S. La Grange
6. Armstrong
7. Possum Corner
8. Natchez
9. Sibley
10. Glen Aubin
11. N. Natchez
12. Kingston
13. Church Hill
14. New Era
15. South Fayette
16. North Lessley
17. Overton
18. Gardens
19. S. White Apple
20. Pellucio Bayou
21. Courtlane
22. Ireland
23. Freewoods
24. Cowpen Point
25. Stanton
26. Wayside
27. Moorland
28. Jeanette
29. Locust Hill
30. Vernon
31. North Overton
32. N. Kingston
33. Commencement
34. Lake Lucille
35. Woodlands
36. E. Fairview
37. Wilkerson
38. Garden City
39. Flat Rock
40. Knoxville Tower
41. Bude
42. Rokie
43. Oldenburg
44. Fayette
45. Rodney
46. Sunnyside
47. Rusoum (Abnd.)
48. Idlewild
49. Anna
50. Buena Vista
51. Levees Creek
52. Saukum
53. Shieldsboro
54. S. Possum Corner
55. Forrest Home
56. Mandamus
57. W. Locust Hill

Louisiana

1. Bee Brake
2. W. Bee Brake
3. Chaney Lake
4. Big Bayou
5. Cocodrie Bayou
6. N. Cocodrie Bayou
7. S. Cocodrie Bayou
8. W. Cocodrie Bayou
9. Deer Park
10. Esperance Point
11. Fairview
12. Helena
13. Holly Ridge
14. Horseshoe
15. Jonesville
16. Lake Bruin
17. Lake St. John
18. Larto Lake
19. S. Larto Lake
20. Lismore Landing
21. Newellton
22. Poole Lake
23. W. Poole Lake
24. Rifle Point
25. Rodney Island
26. Roseland
27. Ross Bayou
28. Sicily Island
29. Vidalia
30. Wildsville
31. Willow Lake

PROGRESS REPORT

Modern Techniques Boost Natchez Area

. . . as prolific producer of high-gravity oil from relatively shallow depths

by G. W. Gulmon and Howard E. Hansen

IN June 1951, a review of the Natchez, Miss., area was published in The Oil and Gas Journal (*"Natchez Area Scene of Active Oil Search," by G. W. Gulmon and N. W. Johns, June 21, 1951, page 200*). That report dealt with the shallow Wilcox pools that were then being developed in what was regarded as phase No. 2 of the area's search for oil. Today, extensive use of detailed subsurface mapping, new concepts of local shale-sand facies change, recognition of tilted or nonstatic water tables, and improved well completion and production methods have been combined to establish the Natchez area as a prolific producer of high-gravity oil from relatively shallow depths. The Natchez area includes Adams, Franklin, Jefferson, Wilkinson, and Amite counties in Mississippi, and Tensas, Catahoula, and Concordia parishes in Louisiana.

Following the first phase of exploration in the interior salt-dome basin of Mississippi and eastern Louisiana, which resulted in the discovery of the larger Tuscaloosa oil and gas-condensate fields on deeper-seated salt-dome structures, the emphasis was shifted to the shallow Wilcox oil sands first encountered in these deep tests.

Exploration techniques . . . For several years following 1944, wells were drilled on sketchy geological information, hunches, doodlebug techniques, and lease-block availability.

Subsurface mapping and careful in-

terpretation of all subsurface data are now recognized as the only reliable method of guiding Wilcox oil development. However, the control for detailed mapping is the result of the earlier drilling by aggressive independents and some major oil companies who considered the returns commensurate with the risk involved in this type of operation. The major companies were, and still are, experimenting with geophysical techniques to locate Wilcox oil accumulations, but this method has not met with even average success.

The larger Wilcox oil fields might have enough structural closure to provide reliable seismograph anomalies, but for the most part the fields are of low structural relief with either an updip "shale barrier" or a dip reversal of less than 30 ft. accounting for the oil trap. Other fields are of the sand-wedge type with no apparent variation from normal dip on recognized contouring horizons. Combinations of these traps on pronounced regional nosings are quite common and, for this reason, caution must be used in evaluating subsurface data during the drilling of wildcat tests.

General Geology

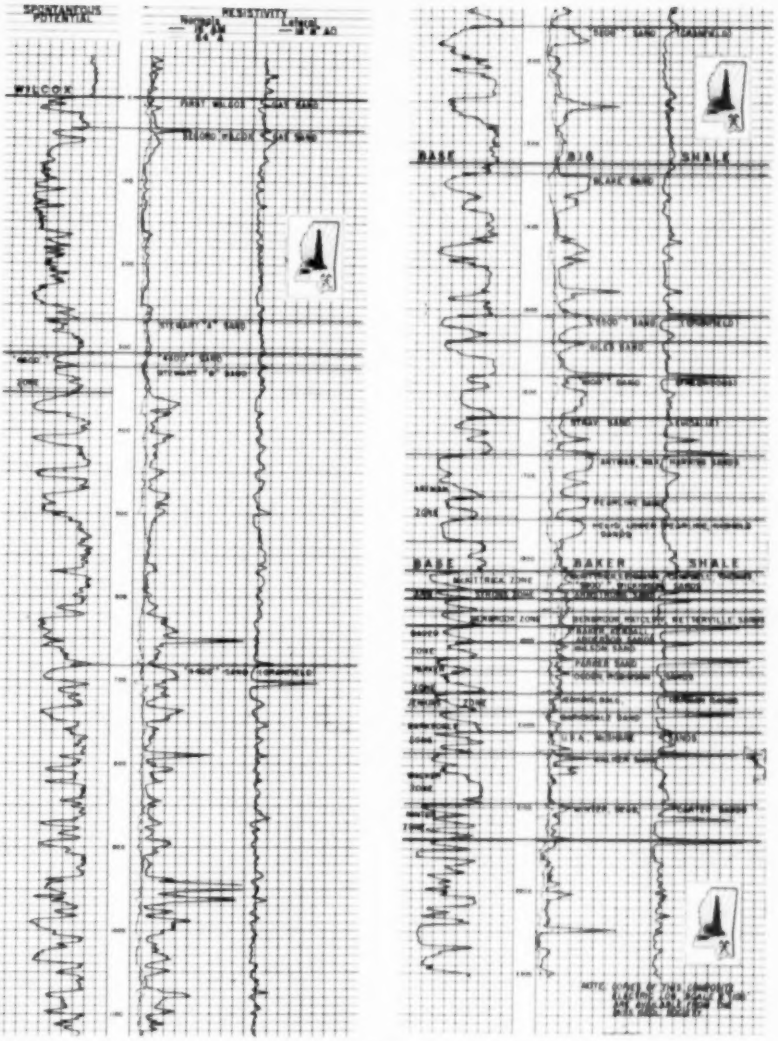
There are varied opinions among geologists of this area regarding the best contouring horizons, but the two used by most are the base of the Big shale and the base of the Baker shale. These are generally reliable markers for the Artman-LaGrange series of sands from which most of the area's oil production is obtained. Isopach maps may be helpful in local areas or with correct interpretation for a given field, but for broad areas they are worse than useless since they are more often misleading. See Fig. 2 for a composite log which shows the multiple-pay sands in relation to the base of the Big shale and the base of the Baker shale.

Depth of production ranges from about 3,600 ft. in Fayette field of Jefferson County to approximately 7,300 ft. in North Lessley field of western Wilkinson County, Mississippi. However, more than 75 per cent of the Wilcox oil production comes from the interval between 5,800 and 6,800 ft.

While these depths may not be considered shallow in comparison with other petroleum producing areas, it should be remembered that, under normal conditions, a 6,500-ft. well may be drilled in less than 2 weeks' time with relatively moderate expense. During the heavy winter rains location expenses may run high, but through most of the year road-building and location-clearing costs are nominal.

Facies change . . . "Shale barrier" is a term generally applied to the "shale out" of a producing sand updip from the producing area. The term is also applied to shale bodies which traverse the producing areas in various directions separating sands of the same zone into different oil pools. This relation, of interfingering sand and shale bodies to petroleum accumulation, is what is referred to in this discussion as a concept of shale-sand facies change for lack of better terminology for something so limited in extent.

Wilcox oil accumulations seem to



COMPOSITE ELECTRICAL LOG showing Wilcox section presently productive in southwestern Mississippi and adjacent areas. (Courtesy Mississippi Geological Society). Fig. 2.

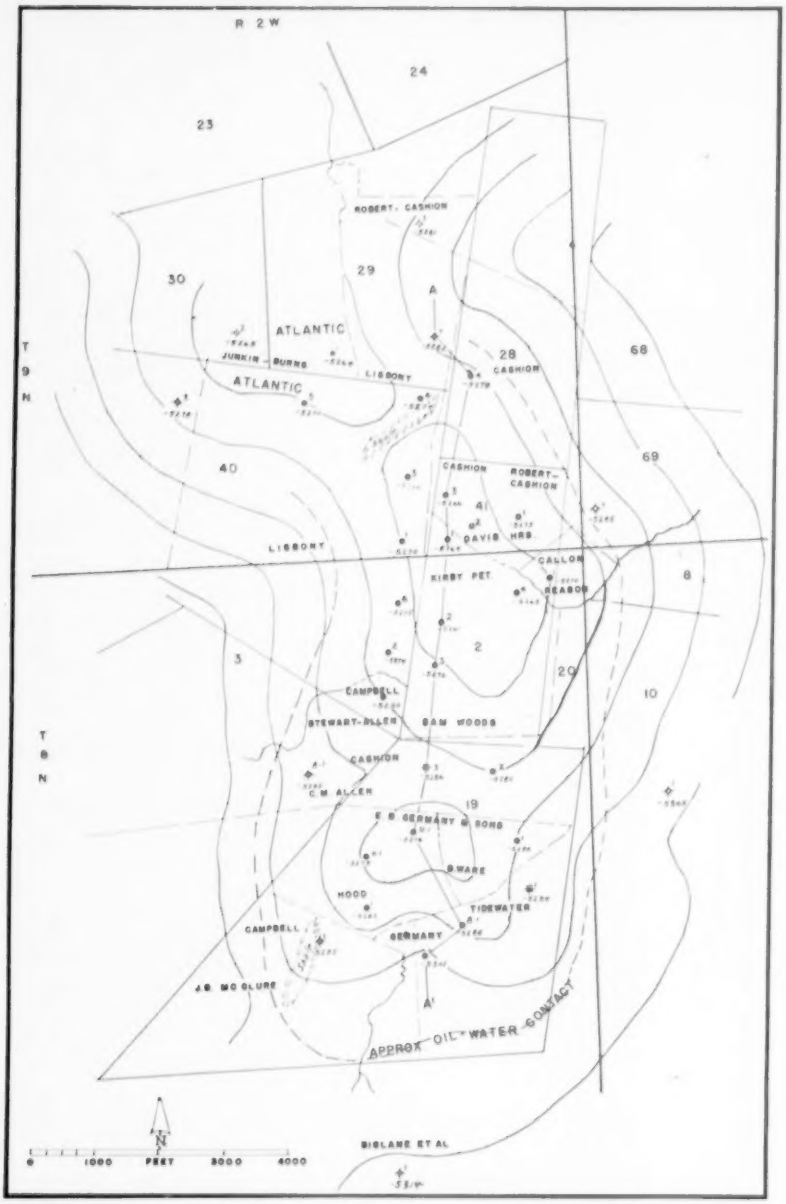
THE AUTHORS

G. W. GULMON

H. E. HANSEN

G. W. Gulmon, consulting petroleum geologist, is a native of Sanborn, N. D. He received his B.A. degree from University of North Dakota's School of Geology in 1937 and during the following summer served as a geologist for North Dakota Geological Survey. He was awarded a petroleum-geology fellowship, and attended Texas A. & M. College from 1937-39, receiving his M.S. degree in geology in 1939. He served as geologist for Standard Oil Co. of California and affiliates — Arabian-American Oil Co., Bahrein Petroleum Co., and Standard Oil Co. of Texas, and The California Co. — from 1939-47. He makes his home in Natchez.

Howard E. Hansen is geologist for Wanete Oil Co., E. B. Germany & Sons, and Calto Oil Co., Dallas. He has done extensive subsurface work in East Texas, Mississippi, and the Williston basin. He is a graduate of Southern Methodist University, with a B.S. in geology.



STRUCTURE MAP of Church Hill field, Jefferson County, Mississippi; contours at 10-ft. intervals are on the Artman sand. (Fig. 3).

exist only in sands which interfinger with shale in close proximity to low-relief structures; massive sands, regardless of position on low structures, rarely contain more than flushed oil shows at the top. Some geologists have used this concept to the extent of contouring areas on estimated sand and shale percentages to determine the average percentage in producing areas and concentrating their exploration in areas where these approximate percentages are likely to appear.

Relation to structure . . . In his symposium on subsurface methods, LeRoy[1] mentions as one of the values of studying facies change: "Selection of areas containing proper facies and facies relationship may reduce exploratory costs for an oil company. The facies factor has many times been more important in controlling oil and gas accumulations than structural conditions." Though LeRoy was referring to new petroleum provinces, the statement holds true for local areas in the Wilcox sediments.

Where thick, oil-saturated sands and multiple producing sands occur, such as those found at Fairview field, Concordia Parish, Louisiana, they are likely overlying a deep-seated structure of considerable relief which is reflected in Wilcox sediments. However, rapid updip gradation from sand to shale at the maximum thickness of a sand lens such as that found at the north end of Esperance Point field would account for a thicker saturated sand section in a single sand body. A large regional nosing such as LaGrange field is, in effect, a cluster of typical Wilcox oil pools superimposed on a regional feature.

Tilted Water Tables

Tilted water tables are included in this discussion not because they are common in the Wilcox, but the recognition of the possibility of this phenomenon as proved by N. K. Hubbert,[2] of Shell Oil Co., in March 1952 will probably result in the extension of some fields of the Natchez area. In most cases excepting the Artman sand fields, nonstatic or variable water tables are a result of a pinchout of multiple producing sands against a growing structural nose and what seems to be the same producing sand with a lower water table might be an entirely different sand.

Example . . . However, the Artman sand has a proven example of a tilted water table without a lithologic barrier to updip migration. This is found in Church Hill field of Jefferson County, Mississippi. The field was discovered in October 1950 by Robert Oil Co. and Lyle Cashion, of Jackson, Miss., drilling their discovery well on a subsurface prospect. Production is obtained from the Artman sand between 5,530 and 5,550 ft., which is approximately 350 ft. below the base of the Big shale in the middle Wilcox. Average sand thickness for the field is 11 ft.

Proof . . . By the end of December 1952 there were 13 wells in the field producing from the Artman sand and cumulative production amounted to 407,892 bbl. of 40°-gravity oil. During this continued production, flowing pressure of the better wells did not decrease as expected and in some cases actually increased. This was interpreted by some interested parties to be the result of a connected reservoir which repressured the developed area as the oil was depleted.

E. B. Germany & Sons, of Dallas, secured leases at the south end of the field and proceeded to test the theory with their 1 B. Ware. This well found the Artman sand at a subsea datum of 5,290 ft. which was below the accepted field water level of a subsea 5,284. Nine feet of oil-saturated sand was proven by sidewall cores and the well was completed flowing 162 bbl. of oil

MISSISSIPPI FIELD STATISTICS

Field, county, location, and operator—	Type	No. wells	Production Nov. 1953 (bbl.)	Development
Anna, Adams (8-8n-2w)—Lyle Cashion Co.	Nose pinchout	*1	1,769	Incomplete
Armstrong, Adams (36-5n-3w)—Sohio Petroleum Co.	Pinchout	*2	1,848	Incomplete
Bude, Franklin (5n-4e)—California Co., Barnsdall	Strat. trap (Tuscaloosa)	*4	3,442	Nearly depleted
Buena Vista, Jefferson (10n-2w)—Atlantic Refining Co.	Pinchout lens (Tuscaloosa)	3	New disc.	Incomplete
Carthage Point (Tuscaloosa), Adams (6n-3w)—Pure Oil Co.	Deep-seated salt dome	†11	14,878	Complete
Carthage Point (Wilcox), Adams (6n-3w)—Vaughey & Vaughey	Low-relief closure	†1 ‡2	4,199	Incomplete
Church Hill, Jefferson (9n-2w)—Robert Oil Co. and Lyle Cashion	Wilcox closure	22	58,497	Incomplete
Commencement, Adams (5n-2w)—Barnett Serio and Calto Oil Co.	Low-relief closure	4	8,478	Incomplete
Courtland, Adams (28-5n-1w)—Barnett Serio Drilling Co.	Strat	1	48	Incomplete
Cowpen Point, Adams (7n-2w)—Humble Oil & Refining Co.	Small closure	1	2,473	Incomplete
Cranfield (Tuscaloosa), Adams-Franklin (7n-1w)—The California Co.	Deep-seated salt dome	79	139,963	Complete
Cranfield (Wilcox), Adams (7n-1w)—The California Co.	Structural closure	*126	29,639	Complete
East Fairview, Adams (9-4n-4w)—Humble Oil & Refining Co.	Structural closure	†1	1,317	Complete
Fayette (Wilcox), Jefferson (9n-1e)—Humble Oil & Refining Co.	Structural closure	33	15,764	
Fayette (Tuscaloosa), Jefferson (9n-1e)—Humble Oil & Refining Co.	Salt-dome structure	17	4,947	Complete
South Fayette, Jefferson (9n-1e)—Sinclair Oil & Gas Co.	Pinchout			Complete—abandoned
Flat Rock, Franklin (5n-1e)—Barnett Serio Drilling Co.	Pinchout	1	491	Incomplete
Freewoods, Franklin (4n-1e)—Lion Oil Co.	Nose pinchout	*4	5,089	Incomplete
North Freewoods, Franklin (5n-1e)—Sunnyland	Nose pinchout	1	1,055	Incomplete—new field
Forrest Home, Adams (8n-1w)—John S. Callon	Wilcox closure	2	1,786	Incomplete
Gardens, Adams (7n-2w)—Humble Oil & Refining Co.	Pinchout	2	2,930	Incomplete
Garden City, Franklin (4n-1e)—Gulf Refining Co.	Pinchout	1	357	Incomplete
Gillsburg, Amite (3n-6e)—Humble Oil & Refining Co.	Low-relief Tuscaloosa	2	1,207	Incomplete
Glen Aubin, Adams (5n-3w)—Barnett Serio-Peterson Drilling Co.	Nose	4	4,242	Incomplete
Idlewilde, Jefferson (8n-1w)—Lyle Cashion Co.	Low-relief Wilcox	5	12,300	Incomplete
Ireland, Wilkinson (4n-1w)—Gulf Refining Co.	Nose pinchout	4	8,753	Complete
Jeannette, Adams (6n-1w)—John S. Callon	Pinchout	2	3,573	Incomplete
Kingston, Adams (5n-2w)—Plains Production Co.	Trap type	27	88,829	Complete
North Kingston, Adams (5n-2w)—J. P. Evans	Pinchout	2	3,819	Incomplete
Knoxville Tower, Franklin (5n-2e)—H. L. Hunt	Pinchout	2	2,711	Incomplete
LaGrange, Adams (7n-2w)—Sohio and Roeser & Pendleton	Pinchout	123	156,900	Complete
South LaGrange, Adams (6n-2w)—Harry Elliott and Kemp Drilling Co.	Low-relief Wilcox	29	43,902	Complete
Lake Lucille, Adams (4n-3w)—Humble Oil & Refining Co.	Wilcox closure low relief	1		Incomplete
North Lessley, Wilkinson (3n-3w)—Barnett Serio-Peterson Drilling Co.	Pinchout	2	546	Incomplete
Levees Creek, Adams (5n-1w)—Jett Drilling Co.	Small closure	4	11,818	Incomplete
Locust Hill, Adams (5n-1w)—Dorris Ballew-John S. Callon	Small closure	4	9,212	Complete
Mandamus, Adams (5n-2w)—John S. Callon-D. A. Biglane	Wilcox closure	1	397	Incomplete
Moorland, Adams (5n-1w)—Barnett Serio Drilling Co.	Small closure	2	2,821	Incomplete
Natchez (Tuscaloosa), Adams (7n-3w)—Humble Oil & Refining Co.	Tuscaloosa type	1	513	Complete
North Natchez, Adams (7n-3w)—Humble Oil & Refining Co.	Small closure	3	3,517	Incomplete
New Era, Adams (6n-3w)—Barnett Serio Drilling Co.	Pinchout	2	163	Incomplete
Oldenburg, Franklin (7n-2e)—Hawkins & Graham	Small closure Wilcox	6	4,862	Complete
Overton, Adams (5n-2w)—Lee Oil Exploration Co.	Nose pinchout	10	22,227	Incomplete
North Overton, Adams (5n-2w)—William Helis	Small closure	2	3,505	Incomplete
Pellucid Bayou, Adams (5n-1w)—Kemp Drilling Co.	Low-relief Wilcox closure	2	1,400	Incomplete
Pine Ridge, Adams (8n-2w)—Phillips Petroleum Co.	Nose pinchout Wilcox	12	29,153	Complete
Possum Corner, Wilkinson (4n-2w)—Southern Production Co.	Small Wilcox closure	3	863	Incomplete
South Possum Corner, Wilkinson (4n-2w)—Gulf Refining Co.	Pinchout	1	216	Incomplete
Rodney, Jefferson (10n-1w)—Southern Production Co.	Tuscaloosa closed structure	2	342	Gas condensate shut in
Saukum, Wilkinson (3n-1e)—Gulf Refining Co.	Pinchout	2	2,897	Incomplete
Sibley, Adams (5n-3w)—Humble Oil & Refining Co.	Wilcox closed structure	30	52,427	Incomplete
Shieldsboro, Adams (4n-3w)—Humble Oil & Refining Co.	Trap	1	2,224	Incomplete
Stanton, Adams (8n-1w)—Austin E. Stewart	Pinchout	2		Shut in
Sunnyside, Jefferson (8n-1w)—J. Willis Hughes	Small Wilcox closure	10	29,571	Incomplete
Vernon, Adams (8n-2w)—Dave Gammill-Lyle Cashion Co.	Pinchout	2	3,591	Incomplete
Wayside, Adams (5n-1w)—Magnolia Petroleum Co.	Pinchout	7	14,626	Incomplete
South White Apple, Franklin (5n-1e)—Lyle Cashion Co.	Pinchout	4	1,482	Complete
Wilkinson, Wilkinson (3n-2w)—Gulf Refining Co.	Pinchout	1		Shut in—incomplete
West Locust, Adams (5n-1w)—Serio-Punches Oil Co.	Wilcox closure	1	1,535	New field—incomplete
Woodlands, Adams (6n-4w)—John S. Callon	Wilcox closure	4	8,300	Incomplete

*Pumping. †Flowing. ‡Gas lift.

per day on a 13/64-in. choke. Subsequent development has lowered the water level to a subsea 5,309 ft. on the south end of the field.

Connection of the producing sand in wells of different water levels was further proven by a cement squeeze on the casing of the Tide Water Associated Oil Co. 1 Drake with a pressure in excess of 5,000 psi. This resulted in a 2-day 50 per cent increase in production in the north offset using the same choke size which had produced at a steady rate for 3 months. See the Church Hill field structure map with the calculated water level crossing contour lines going downdip.

Completion Methods

Improved well-completion and production methods have been developed by production men of this area. Special problems result from the type of wells drilled; a wildcat well is usually drilled to a depth sufficient to test all known producing sands before logging and testing begin. Coring of the extremely thick Wilcox producing section by any method is prohibited by cost in rank wildcats, and sidewall cores are the usual method for checking sands. Therefore when saturated sands are found, production casing is run with as much

LOUISIANA FIELD STATISTICS

Field, parish, location, and operator—	Type	No. wells	Production Nov. 1953 (bbl.)	Development
Bee Brake, Concordia (4n-7e)—Hunt et al.	Pinchout	2	5,502	Incomplete
West Bee Brake, Concordia (4n-6e)—E. C. Wentworth-Justiss Mears Drlg. Co.	Pinchout	1		New field—incomplete
Big Bayou, Catahoula (6n-5e)—H. L. Hunt	New discovery	1	2,374	Incomplete
Cocodrie Bayou, Concordia (4n-8e)—H. L. Hunt	New field	2	1,322	Incomplete
North Cocodrie Bayou, Concordia (5n-8e)—H. L. Hunt	New discovery	1	2,226	Incomplete
South Cocodrie Bayou, Concordia (3n-8e)—H. L. Hunt	Pinchout	1		New field—incomplete
West Cocodrie Bayou, Concordia (4n-8e)—H. L. Hunt	Pinchout (?)	1	266	Incomplete
Deer Park, Concordia (5n-9e)—Carter Oil Co.	Low-relief Wilcox nose	1	412	Complete
Esperance Point, Concordia (5n-9e)—Sinclair Oil & Refining Co.	Low-relief Wilcox closure	21 est.	60,677	Incomplete
Fairview, Concordia (4n-9e)—Sinclair Oil & Refining Co.	Large Wilcox structural closure	11	30,244	Incomplete
Helena, Tensas (10n-10e)—Atlantic Refining Co.	Strat trap (Tuscaloosa)	1	480	Incomplete
Holly Ridge, Tensas (11n-10e)—Carter Oil Co.	Deep-seated salt dome	52	28,358	Complete
Horseshoe, Concordia (6n-7e)—Billups Bros.-Vasser & Brown	Small Wilcox closure	1	3,732	Complete
Jonesville, Catahoula (8n-7e)—Penrod Drilling Co.	Pinchout structural nose			Abandoned
Lake Bruin, Tensas (12n-12e)—David M. Lide	Pinchout (Tuscaloosa)			Incomplete—abandoned
Lake St. John, Concordia-Tensas (9n-9e)—The California Co.	Deep-seated salt dome (Tuscaloosa)	150	316,342	Complete
Larto Lake, Catahoula (5n-5e)—Carter Oil Co.-Phillips Petroleum	Structural nose	3	6,448	Incomplete
South Larto, Catahoula (4n-5e)—H. L. Hunt	Structural nose	6	8,496	Incomplete
Lismore Landing, Concordia (6n-7e)—H. L. Hunt	Nose pinchout	12	25,544	Complete
Newellton, Tensas—David M. Lide				Abandoned—exploratory drlg. anticipated
Pool Lake, Catahoula (8n-7e)—Austin Stewart-Pan American-Southern Corp.	Pinchout	3	1,597	Incomplete
West Pool Lake, Catahoula (8n-7e)—Glasscock Drlg. Co.-W. L. Baker	Pinchout	1	1,612	Incomplete
Rifle Point, Concordia (8n-10e)—Serio Drilling Co.	Pinchout	2	2,592	Incomplete
Rodney Island, Tensas (10n-12e)—Heep Oil Co.	Pinchout—Tuscaloosa stringer sands	1		Incomplete
Roseland, Concordia (4n-9e)—Carter Oil Co.	Structural closure Wilcox	4	9,204	Incomplete
Ross Bayou, Concordia (6n-7e)—Serio Drilling Co.	Wilcox nose	8	29,883	Incomplete
Sicily Island, Catahoula (9n-7e)—The California Co.	Salt-dome structure	5	47,042	Complete
Vidalia, Concordia (7n-10e)—R. A. Campbell-Buffalo Drilling Co.	Pinchout	7	14,401	Complete
Wildsville, Concordia (7n-6e 7n-7e)—Serio Drilling Co.	Pinchout	6	8,836	
Willow Lake, Catahoula (6n-6e)—Phillips Petroleum-Roy L. Fisher	Nose pinchout	3	923	Complete

as several hundred feet of open hole below the guide shoe.

Casing is cemented with plenty of cement, usually 250 to 500 sacks, and with a variety of collars used to insure cementing success. Centralizers are used and generally wall scratchers are worked above and below the producing zone. Some operators prefer to "block squeeze" before attempting completion. Others prefer to squeeze only when channels are apparent in the cement after making production tests. The rule-of-thumb for squeezing perforations is to apply pressure at the rate of 1 psi. for every 2 ft. of depth.

Stage squeezes . . . When pressure will not build up because of porous water sands, stage squeezes are used with about 25 sacks of cement added at 15 to 30-minute intervals allowing the first cement to thicken before building up a pressure. Mud acid is often used to clean the well bore before running casing, but no quantitative estimate may be made of the value of this process.

In a recent case, a fracture process was used with success by I. L. Dillard, production superintendent for Calto Oil Co. A treatment of 2,500 gal. of acid and sand was applied with 6,000-psi. pressure to a well which had been squeezed four times with cement during the course of completion. Dillard correctly figured that the oil flow was restricted by cement in the shaly sand which had not been penetrated by perforating bullets.

After treatment, production rose from 8 bbl. of oil per day to 100 bbl. of oil per day and leveled off at 70 bbl. per day. This success will probably result in other attempts at treating problem wells and, perhaps, the true value of the fracture treatment will be discovered.

Production Practice

Production practices are individual with each field in the Natchez area. Choke sizes are varied alternately to continue a natural flow of oil as long as practicable, but wells are usually placed on the pump when allowables cannot be met by natural flow. Wilcox sands are low-pressure reservoirs with principally water drives and it is inevitable that a well must be placed on the pump to recover all the oil available. Dual completions are not practiced in this area, and in multiple-pay fields such as Kingston, Sibley, and LaGrange there may be three or four wells on a 40-acre unit, each completed in a separate sand.

Geologists were at first skeptical of the high acre-foot recovery of oil predicted by core analysis laboratories, up to 1,100 bbl. per acre-foot for very clean sands, but continued production has indicated that these figures are nearer correct than most had anticipated.

Summary

Allowables are set by the Oil and Gas Board of Mississippi and the Department of Conservation of Louisiana. Allowables for the Wilcox range from 60 to 125 bbl. of oil per day in Mississippi and from 50 to 180 bbl. of oil per day in Louisiana, with no curtailment of producing days as practiced in other states. Foreign oil imports forced pipeline companies to cut their purchases by 10 per cent recently to reduce storage reserves, but allowables have remained the same in hope that this situation will be remedied.

As noted on the area map, there are 89 fields of various sizes in the Natchez area at present and prospects are favorable for immediate extension of a large number of these fields. At this stage in the search for oil, operators are guided more and more by the subsurface geologist and are meeting with greater success. One can say that the area is reaching the age of maturity: enough wells have been drilled to afford a basis for endless research and study into the peculiarities of the Wilcox. Sub-

surface mapping will locate other structural features which will yield oil and stratigraphic wedges will be found in the development of existing fields. In spite of the large number of dry holes that eliminate specific prospects, other prospects appear as a result of the additional information. The area is quite large now and there is definite promise of continued Wilcox production south of this area into Louisiana and the eastern gulf embayment.

Future prospects . . . The Natchez area, as here referred to, remains very active. The Wilcox play has been going on for nearly 10 years and the future holds great promise. The area's activity is expected to spread eastward, westward, and to the south geographically; there will be new pays and new pools in the older portions of the area of interest. The geologist can apply all phases of his training to his particular study of this Wilcox play, and it is notable indeed that in the subject area, which represents one of the youngest producing states, the geologist has returned to one of the oldest tools at his disposal for the discovery of oil—the application of detailed subsurface studies.

Acknowledgments

The authors wish to thank the Mississippi Geological Society for permission to publish the Composite Electrical log.

The production figures are compiled from the Louisiana Department of Conservation records in Monroe, and from the Mississippi Oil and Gas Board records, Jackson.

References

1. LeRoy, L. W., Subsurface Geologic Methods, p. 28, Colorado School of Mines, Dept. of Publication, 1951.
2. Hubbert, N. King, The Oil and Gas Journal, Summary of Theory, p. 215, April 14, 1952.

Increased Efficiency at Pump Stations

(Continued from page 121)

In the advent of failure or serious deviation in one of the signal pressures —gear lube-oil pressure, for example— controller valve 3 will open and admit air to the diaphragm of pilot valve 4. This is a double-acting valve and will cut off the supply air and vent line D simultaneously. With the pressure released from line D, pilot valve 5 closes and shuts off air to the volume-booster relay on the engine. This volume-booster relay is the air-bleeding type; with its supply pressure gone it will close quickly, causing the engine to shut down immediately.

While the diagram of the shutdown system indicates that it is installed on the No. 4 engine with the speed-control system, it is also used on the other engines. In the latter case pilot valve 5 is placed in the air line from the master controller to the volume-booster relay. Blocking of this control line serves the same purpose as in the installation of No. 4.

The system is expansible in that any engine component whose functions are convertible to fluid or gas pressure may be connected to the network so that failure will kill the engine.

Annunciators . . . In the case of engine shutdown it is desirable that operators know immediately which signal pressure failed and caused shutdown. To provide this information, a configuration of pressure gages and check valves are included in the system.

For example, in case failure of pressure in controller 3 caused the shutdown, supply air pressure will immediately be indicated on the 2-in. pressure gage below the controller. The gages below the other controllers will show zero pressure since the control valves are closed and pressure from line C is blocked by the check valves.

Thus, by a glance at the indicator

It takes MEN MACHINES and MONEY

Combining all these into a profitable oil or gas business requires specialized financial advice—and oftentimes a loan.

These are everyday functions at the U. S. National Bank—handled thoroughly and capably by men who know the oil and gas business.

Our reputation as **"the oil bank of Denver"** has been built on a practical, working knowledge of your special problems. Why not take advantage of it?

United States

NATIONAL BANK OF DENVER
SEVENTEENTH AND STOUT STREETS
MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

gages, the operator can tell quickly which signal caused shutdown.

Inexpensive . . . Original estimate of the cost of installing a shutdown system amounted to almost $8,000. This estimate was based on using a factory-designed circuit which would have included several expensive components. The system described above was installed for approximately $2,400, with major economies being realized from the use of small, inexpensive components and incorporating them in a simple, straightforward system.

Operation to Date

The control system has given very satisfactory service since the elimination of difficulties with the speed transmitter. The close speed-load control has made it possible to work the pipeline at its peak load at all times. Fuel consumption on a per barrel throughput basis has decreased due to the elimination of surges and overloads which are common in manual operation. In general, the performance has been satisfactory and consideration for other locations is indicated.

ARCCO
The World Over
—wherever there is gas
ARCCO-ANUBIS
'Dry-Air GAS
GRAVITOMETERS
This new Arcco-Anubis Dry Air Gas Gravitometer determines and records specific gravity of gases automatically corrected to the humidity content of the air. The difference in weight between a column of GAS and equal column of DRY AIR is measured. This ratio represents the true specific gravity of the sample.
One bell of the instrument is filled with gas which is being measured, and the other bell is filled with dry air Otherwise, except for the new instrument having one column for gas and one column for dry air, the unit is identical in operation to the standard gas gravitometer When calibrated and properly installed, these instruments require little attention other than to wind the clock, ink the pen, and change the chart Send for bulletin No. 101
AMERICAN
RECORDING CHART CO.
3113 E 11th St • Los Angeles 23, Calif
Available for Early Delivery
Send for Bulletin No. 101 Revised

Treating Gasoline by Dualayer Process

(Continued from page 123)

charge was needed in the pilot unit to remove mercaptans from the treating solution used in the experiments reported in Table 2. Several modifications of the regeneration procedure are possible. The coexistence of three layers — gasoline, potassium hydroxide, and potassium cresylate—in equilibrium with respect to mercaptan concentrations shows that either of the two alkali layers will reduce the mercaptan content of the gasoline.

However, the favorable equilibrium conditions are established on account of the tremendous absorptive capacity of the potassium cresylate layer for potassium mercaptides. In the absence of the potassium cresylate layer, mercaptans distribute relatively evenly between the gasoline and potassium hydroxide solution and their extraction becomes difficult. If the spent potassium hydroxide solution from treating is brought in contact with the potassium cresylate layer, mercaptans are absorbed by this layer and the potassium hydroxide solution regenerated.

Regeneration of mercaptans from the potassium cresylate layer is accomplished by diluting with water and steam stripping the diluted solution. Since the required potassium cresylate to gasoline treating solution dosage is very low, in some cases as low as 2 volume per cent, only a small quantity of water is required to provide very dilute solutions for stripping. The advantages of stripping dilute solutions may be visualized from Fig. 2. The ease of stripping is inversely proportional to the mercaptan-extraction ability of the solution and water dilution reduces the mercaptan extraction power of the solution.

Process flow . . . A typical flow diagram for a commercial process is shown at the start of this article. It is only one of the possible variations of the flow of materials which was found to be the best for solving a particular refinery problem. Gasoline distillate containing mercaptans enters two-stage countercurrent extraction system **A.** The small quantity of the treating solution employed favors the use of mixing and settling stages in preference to tower extraction.

The doctor-sweet gasoline is pumped to storage and the spent treating solution is diluted with an equal volume of water and settled in equipment now shown to remove small quantities of entrained gasoline. The diluted solution is directed to the regeneration tow-

er **B** equipped with closed steam coils. Water, added to the treating solution in the previous step, is converted into stripping steam by the closed steam coils. It is removed as a liquid on the water separation tray in the upper portion of the column and used for diluting the stream of the spent solution.

Vapors from the stripper are condensed and the mercaptans are withdrawn from the system from **C.** The water layer is returned to the top of the stripper tower. The lean treating solution is blended with a small quantity of 50° B. potassium hydroxide solution and fed to the Dualayer equilibrium drum **D.** The two layers are separated, and the top layer, which contains the potassium cresylates, is used as the treating solution. Small quantities of potassium cresylate solution may be withdrawn from the system if excessive quantities of cresylic acid are present in the raw gasoline distillate. The unit described above is now under construction at the Beaumont refinery of Magnolia.

References

1. Duval, C. A., Pet. Ref., 30, No. 2, 85 (1951).
2. Hanson, T. K., and Coles, K. F., J. Inst. Pet. 33, 589-97 (1947).
3. Kalichevsky, V. A., Pet. Ref. 30, No. 4, 111-7 (1951).

TV—New Industrial Tool

by Bertram F. Linz
Journal Staff Writer

INDUSTRY is getting another new tool—television.

Not the kind of television that brings in the newest comedians and the oldest movies, but a kind tailored to the specific needs of a particular plant or operation, which needs no channel on the air or license from the Government.

Industrial television is a method for "remote watching" of operations, equipment and people. It's so new that its possibilities in the oil industry are largely unknown. Installations last year accounted for less than $10,000,000 of the electronics industry's multibillion-dollar business, but the significant thing is that last year's volume was 10 times that of 1952.

It already is extensively used in the most modern steel plants, which because of the heat and danger of some operations were among the pioneers in this field. It is being used in laboratories for remote watching of high-pressure equipment, in automatic plants for remote metering and remote visual control, and for watching boilers and smokestacks (by Pacific Gas & Electric Co., for one).

An eastern oil company used television to introduce its new gasoline, and a radio-manufacturing company used it to catch a stockroom looter. At factory gates it is being used to "see" who comes into a plant, and in other installations it is being used for all sorts of control purposes, to improve safety and for training.

Not too many companies have realized the possibilities of television as yet, possibly a few hundred, and its potential value has not been gaged, but electronics engineers say it is going to be a big thing in industry, and a half-dozen companies already are producing or planning to produce the necessary equipment.

Industrial television gets off the air and avoids the need of a license by use of a closed wire circuit. Theater

OIL INTERESTS IN CANADA?

You need The Bank of Toronto

...AND HERE'S WHY

The Bank of Toronto is geared to give you speedy service in the heart of Canada's oil boom.

- FINANCING FOR DEVELOPMENT OF PROVEN WELLS
- LIAISON SERVICE FOR OIL MEN
- FOREIGN EXCHANGE INFORMATION AND BUYING OF FOREIGN FUNDS
- ARRANGEMENT OF TRAVEL FUNDS FOR BUSINESS TRIPS
- ACCOUNTS FOR PAY OPERATIONS ON THE JOB
- TRANSFER OF FUNDS TO ALMOST ANY PART OF THE WORLD FOR FOREIGN WELL EMPLOYEES

Write today for full particulars—you'll appreciate our contacts in the Canadian oil industry.

THE BANK OF TORONTO

Established 1856

A. R. Profit, Manager, The Bank of Toronto, *Calgary, Alberta, Canada*
I. J. Hutton, Manager, The Bank of Toronto, *Edmonton, Alberta, Canada*
Oil Representative: P. W. Atkinson, *Calgary Branch*

television operates the same way. The circuit may be entirely within a single plant, or it may be a "hookup" covering a wide section of the country. Beyond the closed circuit and its automatic operation, it is much like entertainment television. But it needs no announcers, microphones, or "props," and the "actors" are instruments, machines, or people going about their usual pursuits.

Like two other tools introduced in the past few years, short-wave radio communication and radioactive isotopes, industrial television is an instrument for special purposes. In use, cameras are set up at the point where the desired information originates. The picture transmitted by the cameras can be received where it can be used to control operations or record data.

The possibilities of this type of television are not confined within the walls of a plant or laboratory. The information picked up by a camera may be transmitted over long distances; the oil company that introduced a new gasoline in this manner used a closed-circuit covering 14 cities and told its story to 2,000 dealers simultaneously.

Electronics manufacturers are working at high speed to simplify already simple equipment. Already, a plant installation can be made with a camera that can be held in the hand and a control unit no bigger than a table radio. Illuminated by infrared "black light," the camera can work in the dark. At a central point, one man can watch operations at a number of places, and with the use of remote-control devices can make adjustments of operations.

The setup for an industrial television installation is equally simple.

All that is necessary is the camera, which may weigh less than 5 lb., equipped with a standard 16 mm. camera lens; a control chassis weighing about 18 lb., and a standard television receiver.

A multiconductor cable connects the camera and control box, which may be as much as 500 ft. apart, and standard 300-ohm twin lead transmission lines connect the control box and receiver. The whole installation can be set up by nontechnical personnel, and operates from any 115-volt a.c. outlet.

The camera, through the control box, may be connected to any channel between 2 and 6 of the television receiver. One camera may be connected with several receivers at separated points, or several cameras may be tied into the same receiver on different channels. Once the installation adjustments have been made, the camera can do its job unattended.

Electronics engineers hesitate to talk about the possibilities of television in the oil industry. They haven't surveyed them much as yet. But they think they are good, once the industry begins to experiment with it as it did with radioisotopes.

BORASCU* destroys weeds and grasses at a fractional cost of hoeing methods etc. Enjoy substantial savings by using BORASCU* about *your* tank batteries, well sites and heater units, just as many other petroleum producers do now. BORASCU* destroys most vegetation; prevents future growth for 12 to 24 months, or longer, when correctly used! Borascu* and Concentrated Borascu* are applied dry . . . with spray equipment, use our new, *non fire-hazardous* Polybor-Chlorate-88.

*Reg. U.S. Pat. Off.

NONCORROSIVE* • NONPOISONOUS • NONFLAMMABLE • NONSELECTIVE

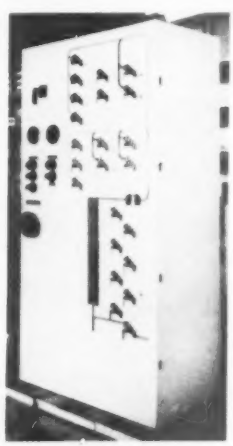
*To Ferrous Metals

PACIFIC COAST BORAX CO.

DIVISION OF BORAX CONSOLIDATED, LIMITED

820 SO. SHATTO PLACE • LOS ANGELES 5, CALIFORNIA

Weed Control Dept. Representatives located in: CHICAGO • NEW YORK CITY • NEW ORLEANS SEATTLE • PORTLAND, ORE. • CLEVELAND, OHIO • AUBURN, ALA. • KANSAS CITY, MISSOURI HOUSTON, TEX. • FT. WORTH, TEX. • AMARILLO, TEXAS • BOZEMAN, MONT. • MINNEAPOLIS, MINN. • SAN FRANCISCO • Home Office: 630 S. SHATTO PLACE, LOS ANGELES 5, CALIFORNIA



Graphic Panel for Centralized Control

In the article, **Instrumentation of a Chemical Feed System,** by R. T. Sheen, issue of March 15, the wrong photograph was inadvertently used as Fig. 8. The correct figure is reproduced here. This is a typical graphic panel used for centralized control and recording of operation of 23 controlled-volume pumps.

1 POPPING THE LINE. Dirt, rocks, fluid, and debris are blown from the line at start of cleaning operation.

2 WHITE VAPORS indicate line is free of all loose matter. Next step is to clean with abrasives.

Plastic coating a pipeline

. . . *without lifting the line*

THE application of a plastic coating to the inside of an 18-in. pipeline, owned by Cabot Carbon Co., has recently been completed. Coating was accomplished without lifting the line except where materials and tools were inserted.

To recondition this line it was necessary to replace some sections of pipe and patchweld others. A thorough cleaning, drying, and coating of the interior with a plastic material then followed.

While the coating of small-diameter lines is not new, it is only recently that attempts have been made to coat a line of 18 in. or more in diameter.

The line . . . This 13,000-ft. gas line, serving three plants near Kermit, Tex., is made up of spiral-weld pipe and was installed in 1937. The line was failing because of internal corrosion—particularly in low places. Because of recent steel shortages, some of the 18-in. pipe had been replaced with standard 14-in. pipe which complicated the coating work.

This fact made it imperative to consider the work as three separate, although continuous, operations.

Section 1 consisted of 7,800 ft. of 18-in. line, including a 120-ft. length which was severely damaged by internal corrosion and had to be replaced with new pipe.

Section 2 was a 420-ft. length of comparatively new 14-in. pipe.

Section 3 was made up of both 18 and 14-in. pipe and terminated in a three-lateral Y. In this 4,720-ft. section it was necessary to replace two 80-ft. lengths with new pipe.

Since the coating operation demands an integral line, all drips and lateral had to be capped off. In the three sections there were 11 drips and 5 laterals to be disconnected.

Cleaning operation . . . The line was removed from service at 8 a.m. and the main valves closed. The pipe was then cut and pup joints were welded on each end of Section 1.

The pup joints are loading barrels which are fitted with various valves, connections, and gages. Each joint has a special, patented, pressure-tight circular door hinged below, latched above. The latch has an extended arm and trigger which can be tripped under pressure to "pop" the line, as is done in the cleaning process to remove cuttings, waste, and debris.

Popping the line is a spectacular operation which consists of the building up and sudden release of internal air pressure. When gages at both ends of the section showed 45 psi., the lease end of the line was popped. The trigger was tripped and fluids, dirt, debris, gas and air roared out the open end. In a few minutes the line restored itself to atmospheric pressure.

The line was popped twice in this way to displace residual matter, dirt, or any other foreign material that might be in it.

After the line was displaced, welding crews cut off all drips and laterals and sealed the openings with prefabricated steel patches which had been made up beforehand to avoid delays during this highly critical operation.

The degreasing operation followed, which consisted of flushing the line with petrochemical cleaner.

A similar step, using water, was next. The sulfur salts present in this line had been tested earlier for their water solubility, and fresh well water was found adequate for this purpose.

The pup joint at the lease end of Section 1 was closed. A bell plug inserted in the plant pup joint. It was followed by eight wads of steel cuttings. Between the wads, quantities of wiping waste was inserted to assist in drying the line and to help pick up salts, scale, iron oxide, and other products of corrosion and deposition. This load was followed by a trailing bell plug.

As the pup joint was closed at the "plant" end of the line, pressures were built up to force the load through the line and prepare it for popping at the lease end.

It took approximately 20 minutes for the pressures to reach their peak. When the line was popped the familiar gush of fluids roared out, followed closely by the steel cuttings and wiping waste.

This operation was twice repeated, until a final load of clean string wiping waste went through the line alone and came out clean. The line was ready for coating.

Priming and coating . . . In applying

3 BELL PLUG is forced into loading barrel with hydraulic jack. Air pressure moves plug easily after barrel is sealed.

4 TWO PIGS are shown after leaving end of a section. These were plugs of cleaning train. Note the wiping waste between plugs.

the various coatings, solvents, or diluents, a slightly oversized, dual-opposed bell plug was inserted into the pup joint and forced down the line a short distance by air pressure. In the priming operation, the vinyl wash primer with an acid diluent was placed in the loading barrel with a bell plug inserted behind it. The door of the barrel was then closed and back pressure applied from the opposite end of the line. This forced the leading bell plug and the primer back toward the trailing plug and allowed all entrapped air to escape through an open valve in the pup joint.

All valves were then closed and a pressure differential was applied against the charge. Thus, the entire priming charge moved forward and deposited an even coat of material on pipe wall.

After the primer had dried thoroughly, a coat of heavy-bodied zinc chromate was applied in a similar operation. The line was again allowed to dry.

The final coating step was to apply a phenolic-base, air-drying coating to seal the line against internal corrosion. This particular coating system, specifically selected according to the function the line performs, is guaranteed by the contractor for a period of 2 years against leaks or coating failures.

When the line was dry, drips and laterals were replaced, a block valve was set at the lease end and Section 1 was restored to service. Within 69½ hours, the plant returned to 80 per cent schedule.

Sections 2 and 3 were similarly processed. These two sections required 54½ hours to finish in a compound operation which made use of a special shunt technique between adjacent pup joints at the ends of Sections 2 and 3, where the only difference was the diameter of the pipe.

The list of vehicular equipment used on the job included dozers, side-boom tractors, seven truck-mounted welding rigs, pickups, jeeps, and crew cars. The majority of the moving equipment carried two-way radios since close coordination of all operations was required.

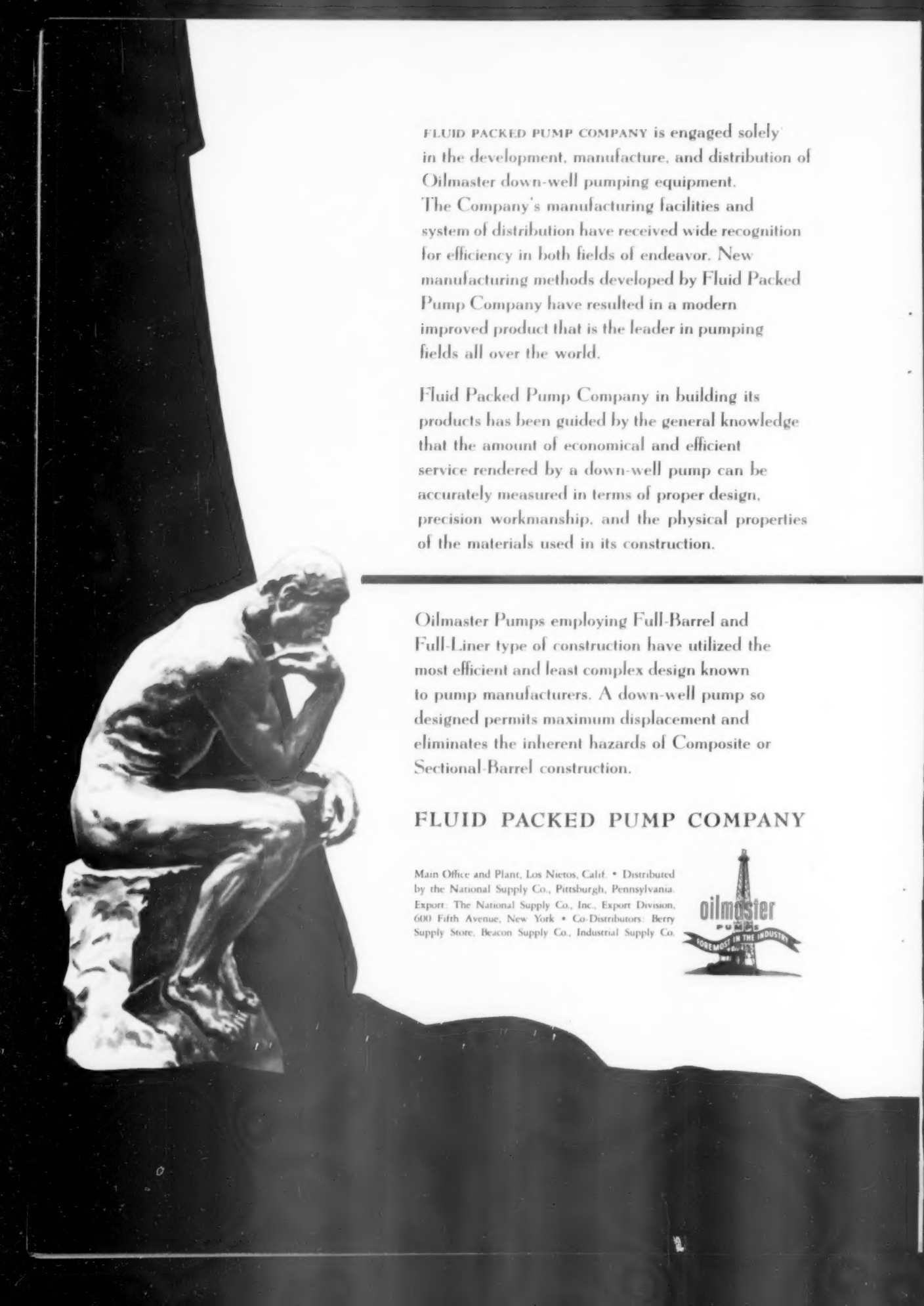
Compressors used on the job were two diesel-driven 650-cu. ft. per minute units, one diesel-driven 365-cu. ft. per minute unit, and one gasoline-driven 105-cu. ft. per minute unit.

Contractor on the job was Internal Pipeline Maintenance Co., of Odessa, Tex. The coating used was developed by Pipelife, Inc., of Odessa, in cooperation with major coating manufacturers.

5 BARREL IS LOADED with phenolic-base plastic material for interior-coating operation. Note the trigger release on barrel door.

6 JUNCTURE OF SECTIONS. Coating material was pumped from 18-in. to 14-in. without further handling by crews.

A company
devoted to
a single purpose
builds a
better product



FLUID PACKED PUMP COMPANY is engaged solely in the development, manufacture, and distribution of Oilmaster down-well pumping equipment. The Company's manufacturing facilities and system of distribution have received wide recognition for efficiency in both fields of endeavor. New manufacturing methods developed by Fluid Packed Pump Company have resulted in a modern improved product that is the leader in pumping fields all over the world.

Fluid Packed Pump Company in building its products has been guided by the general knowledge that the amount of economical and efficient service rendered by a down-well pump can be accurately measured in terms of proper design, precision workmanship, and the physical properties of the materials used in its construction.

Oilmaster Pumps employing Full-Barrel and Full-Liner type of construction have utilized the most efficient and least complex design known to pump manufacturers. A down-well pump so designed permits maximum displacement and eliminates the inherent hazards of Composite or Sectional-Barrel construction.

FLUID PACKED PUMP COMPANY

Main Office and Plant, Los Nietos, Calif. • Distributed by the National Supply Co., Pittsburgh, Pennsylvania. Export: The National Supply Co., Inc., Export Division, 600 Fifth Avenue, New York • Co-Distributors: Berry Supply Store, Beacon Supply Co., Industrial Supply Co.

oilmaster PUMPS FOREMOST IN THE INDUSTRY

1 APPLYING ASPHALT SHEETS . . . Catalytically blown asphalt was first applied to an old lining and sheets imbedded in this sticky membrane.

2 SHEETS BUTTED UP against each other and 6-in.-wide strips used to seal the lining. A special mastic adhesive completes the seal.

Salt-water reservoir lined with asphalt "planks"

by F. Lawrence Resen
Gulf Coast District Editor

A RECENTLY developed prefabricated plank-type asphalt lining was installed in the salt-water reservoir at the Dollarhide Gasoline Plant, operated by Pure Oil Co., in Andrews County, West Texas.

The reservoir, which holds in excess of 10 million gallons when full, is used to store salt water obtained from washing out a propane storage cavity in an underground salt deposit. Highly concentrated salt water resulting is kept available for reinjection into the storage cavity when it is desired to recover propane.

Approximately 197,000 sq. ft. of asphalt lining was used in coating the reservoir which has a 700 ft. length and a 250 ft. width, with a 10½ ft. deep holding capacity.

The plank-style lining is a flexible asphaltic sheet, containing an especially formulated asphalt reinforced by selected fibres. The sheet is formed between two layers of felt which are treated to endure extreme weathering. The particular sheets used at Dollarhide were 3 ft. wide, 12 ft. long, and ½ in. thick.

Application . . . The plank-style asphalt lining was applied over an asphalt-concrete lining. The asphalt-concrete lining was applied to surface soil which had been compacted. In applying the plank-style asphalt lining, a membrane of catalytically blown asphalt was first applied over the surface of the asphalt concrete in a conventional manner by a paving distributor. This cat-blown material is much less susceptible to temperature changes and is stickier than normal paving asphalt. It was used so that a permanent bond would be effected between the surface of the asphalt concrete and the plank lining.

The individual sheets of plank-type asphalt were laid on top of the cat-blown membrane, with each previous sheet butting up against the one(s) previously laid. Since the cat-blown membrane was applied several days prior to the plank-type application, it was softened by means of a blow torch. Hence, a direct adhesion was achieved between the membrane and the sheets, with the latter being firmly imbedded in the cat-blown asphalt.

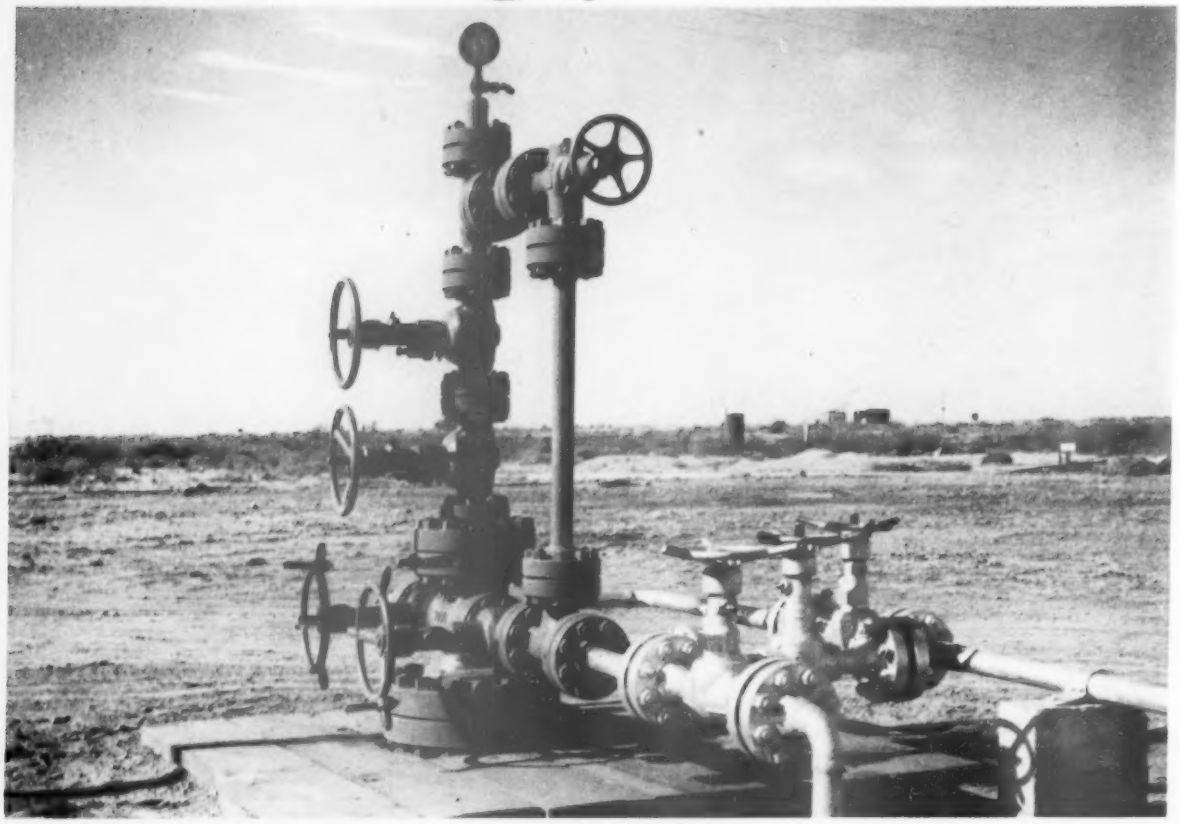
Six-inch-wide strips of plank asphalt were used to cover the butted edges, except on corners where the sheets were lapped. A special mastic adhesive was used to complete the seal. With the strips laid on top of the butted edges, the water pressure from the reservoir loading will tend to aid the seal.

Approximately 4,700 sheets were used to line the reservoir, with about 5,300 strips required for sealing. An interesting aspect of the application work is that a crew of Pure personnel working with a manufacturer's representative on hand, were able to complete the installation at an approximate labor cost of 40 cents per square yard, requiring some 2,800 man-hours for the laying of the plank lining.

The plank-type lining is a development of L. F. Bramble, president, Gulf States Asphalt Co., South Houston, Tex.

3 COMPLETED INSTALLATION of reservoir looked like this just before water was pumped in. Dollarhide plant may be seen in background.

FORGED STEEL ORBIT VALVES PRODUCTION VALVES



Tested Twice-Before Installation

Each and every Orbit Forged Steel Production Valve after assembly at the factory is subjected to a series of final tests. All testing is done with cold water. The downstream end of the valve body is plugged with the valve in an open position, full test pressure is applied rapidly several times then suddenly dropped, full pressure is then applied and maintained for long periods of time. This insures a good body test. The next step — we remove the plug or test flange, close the valve and apply full unbalanced pressure to the valve seat. This gives us a check on ease of operation and the valve's ability to hold pressure equal to or above its rated working pressure that will be stamped clearly upon the valve body before shipment.

Large numbers of Orbit Production Valves go into prefabricated christmas trees. It is a known fact that all reputable well head manufacturers rigidly test such equipment. Before a christmas tree can be tested — it first must be assembled, therefore when Orbit Forged Steel Production Valves are specified by you they receive another tough test by your favorite well head manufacturer.

BRANCHES

HOUSTON, TEXAS
405 Velasco
(Serving the Gulf)

CASPER, WYOMING
247 West First St.
(Serving the Rocky Mountain States and Canada)

ODESSA, TEXAS
402 West County Road
(Serving West Texas)

ORBIT VALVE CO.

P. O. BOX 699 TULSA, OKLAHOMA

How to Size Relief Valves for Compressed-Gas Containers

by F. J. Heller

A NEW approach to the safety relief device capacity determinations was made in the 1953 issue of N.F.P.A. Pamphlet No. 58. It is significant that even though a new approach was made, the new requirements were in substantial agreement with the requirements calculated using Fetterly's formula. Excellent industry experience for the past 25 years, based on sizing relief devices according to requirements based on Fetterly's formula, then became an ideal service test for the requirements calculated in accordance with the new approach which has sound thermodynamic and scientific background.

Some readers may ask: Why change to the new flow formula if there is no significant change from the use of Fetterly's formula? The answer is simple. Experience proved that the basic assumptions made by Fetterly were sound; however, the familiar "D × U" used in Pamphlet No. 58, to determine the minimum required rate of discharge in cubic feet per minute of L.P. gas at 120 per cent of the maximum permitted start to discharge pressure for safety relief valves to be used on containers other than ICC, introduced errors because the relation of the D × U value to the actual area of a tank varies with the shape of the tank, particularly the head shape. In addition, some confusion existed as to whether U refers to tangent length or over-all length. Furthermore, regardless of the value Fetterly used, the industry knew absolutely nothing about the flow efficiency of valves. The only criterion was area. Also Fetterly's formula was difficult for the layman to use. In view of the industry's desire to provide the maximum reasonable safety precautions, it was imperative that Appendix A be as accurate and as easy to use as possible. It was for these reasons that the new approach was made and accepted by the Liquefied Petroleum Gas Association, the National Fire Protection Association, and the U. S. Coast Guard.

The formula for safety device flow requirements is:

$$Q_a = \frac{633{,}000\ A^{0.82}}{LC} \times (ZT/M)^{1/2} \quad (1)$$

where:

Q_a = flow of air cu. ft. per minute at standard conditions

A = total outside area of container in sq. ft.

L = latent heat of gas at flowing conditions in B.t.u. per lb.

C = constant for gas which is a function of the ratio of specific heats at standard conditions

Z = compressibility factor at flowing conditions

T = absolute temperature at flowing conditions

M = molecular weight of gas

It is very important that the user of this formula take cognizance of the fact that its use will give, for unlagged containers, the minimum required rate of discharge in cubic feet of air per minute for any gas provided the physical constants for the particular gas in question are for the temperature and pressure at full open-flowing conditions. Thus, for N.F.P.A. Pamphlet No. 58 use, the flowing conditions will be 120 per cent of the start to discharge pressure setting, 110 per cent for the A.S.M.E. Code Applications, 100 per cent for the ICC applications, and 120 per cent for the A.P.I.-A.S.M.E. Code Applications.

Substituting the physical properties for propane at 300 psig. of L = 110, C = 330, Z = 0.70, T = 600, M = 44.09 in Equation 1.

$$Q_a \text{ for propane} = \frac{633{,}000\ A^{0.82}}{110 \times 330} \times [(0.70 \times 600)/44.09]^{1/2}$$

$$Q_a \text{ for propane} = 53.632\ A^{0.82}$$

For convenience in using these equations, Fig. 1 of C vs. k and Fig. 2 on A vs. $A^{0.82}$ are included in later installments.

This safety device flow requirements formula, as previously stated and with a different constant, is applicable to the determination of the flow of air in cubic feet per minute, requirement for the safety device on any size container. For any gas the formula may be written:

$$Q_a = G\ A^{0.82}$$

where:

Q_a = flow of air in cubic feet per minute at standard conditions

G = gas constant for gas to be used

A = total outside area of container in square feet

This is based on the best information available to the author at the time of this paper. (Data which could not be checked have been omitted. Data reported are as accurate as published data on physical constants for these gases and the values used are shown in later installments.)

The following factors for G in this equation may be used:

GAS CONSTANTS FOR NEW FLOW-REQUIREMENTS FORMULA

Name of gas—	"G" factor for use in formula $Q_a = G\ A^{0.82}$
Anhydrous ammonia	22.11
Butane (normal)	44.37
Carbon dioxide	47.35
Chlorine	52.73
Dimethylamine	31.06
Dichlorodifluoromethane	73.84
Dichlorotetrafluoroethane	84.87
Monochlorodifluoromethane	65.64
Trichloromonofluoromethane	69.32
Methyl chloride	40.36
Propane	*53.63

*At the time of the L.P.G.A. committee work, specific heat data was not available for propane at flowing conditions. Knowing that the Constant C would be smaller for ratios of specific heats at standard conditions than at flowing conditions and consequently would require larger flow requirements, the committee used the C constant at standard conditions. This is on the safe side as it requires a greater flow requirement for the safety relief valve.

By the same token, if specific heat data are not known for any gas, the formula may be used for substituting physical properties at flowing conditions and use a Constant "C" for standard conditions. This practice would give a conservative figure on the safe side.

For lagged containers Equation 1 can be written:

$$Q_a = \frac{633{,}000\ F\ A^{0.82}}{LC} \times (ZT/M)^{1/2}$$

where:

F = factor to give credit for insulation

The simplified formula would then become:

$$Q_a = F\ G\ A^{0.82}$$

The Safety Device Committee of the Compressed Gas Association is currently working on the development of values for F.

In case one does not have compressibility factor or C factor data for the temperature and pressure represented by flowing conditions, outlines of a method which may be used to calculate these values for a given gas will be presented in the next installment. The physical properties used in calculating the values of the Constant G will be shown as well as examples of typical applications to specific container sizes.

Author is technical representative, Phillips Petroleum Co., Bartlesville, Okla.

Right on the Line

WEST OF BILLINGS, MONTANA, on the Yellowstone Pipeline job, this CLEVELAND Model 320 Pipeline Trencher is digging its way up a 250 foot hill of layer rock at an angle of better than 30° after digging 4 miles of straight trench through a dry lake bed. Inspectors for the Lowery-Continental Oil Co. maintain this is the straightest 4 miles of trench they have ever seen.

The operator of the trencher, owned by Ross & Powers of Billings, said he knew the 320 would take the hill in stride without help from a tow cat because he had negotiated similar or worse hills with other CLEVELANDS.

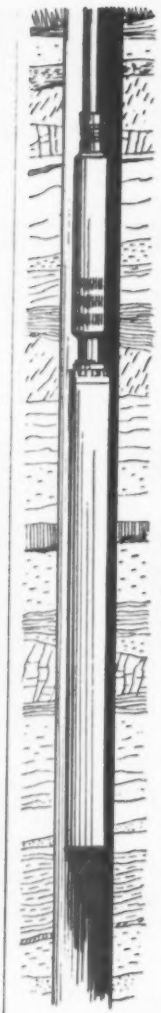
Confidence like this has to be earned. Thousands of miles and long years of dependable pipeline performance have earned for CLEVELANDS their top rating with pipeliners the world over. The same high quality in design, materials and construction, and the same kind of performance records have won similar confidence for all sizes and models of CLEVELANDS on trenching jobs of every type. They'll be *"Right* on the Line" for you, too.

Write for descriptive bulletins and specifications, or get the full story on CLEVELANDS from your local distributor.

THE CLEVELAND TRENCHER CO.

"Pioneer of the Modern Trencher"

20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO



THE BEST WAY TO *LOWER* OPERATING COSTS.... *LOWER*

A REDA PUMP INTO YOUR WELL

With continually rising labor and investment costs, economy of operation is of paramount importance in producing wells with decreasing oil - water ratios.

Reda pumps are given consideration as original or replacement equipment because of their known performance in producing fluid at a *lower* cost per barrel, thus often extending the ultimate economic life of wells.

Improved engineering and design have increased operating life. Increased operating life means *lower* labor cost per barrel, *lower* investment cost per barrel, *lower* maintenance cost per barrel: *lower cost per barrel produced.*

REDA

PUMP COMPANY

BARTLESVILLE, OKLAHOMA

Here's a New Pneumatic Interlock

by T. J. Kirwin

A PNEUMATIC interlock has been developed for a particular process control application; however, because of its simplicity and flexibility, it can be adapted to a variety of functions with minor modifications. It has proved extremely reliable and has required no maintenance other than routine servicing.

The basic element of the interlock and the principle of its operation are shown in Fig. 1. The three-way diaphragm-operated pilot valve is held in open position by air admitted through a restricting orifice. Air pressure is maintained on the valve diaphragm by a two-way diaphragm-operated pilot valve, which is held closed by air pressure from the sensitive pressure relay.

The relay is actuated by the process variable transmitter. When the output of the transmitter reaches the set point of the pressure relay, the relay vents the diaphragm of the two-way pilot valve which causes the three-way pilot valve to operate. The three-way pilot valve is used to open or shut a process control valve.

Advantages . . . Several features of this arrangement are apparent. The system is "fail safe" in operation—loss of air supply to any component operates the process control valves. Secondly, since the air supply to the pressure relay is connected after the restricting orifice, return of the transmitter signal to a safe value will not reactivate the system. The interlock must be reset before the process control valves can be operated. Thirdly, by proper sizing of the restricting orifice, the piping, and the two-way pilot valve, the interlock can be made to operate in a fraction of a second.

Author is instrument superintendent, Victoria plant, E. I. du Pont de Nemours & Co. From paper presented at Texas A. & M. Instrumentation Symposium, College Station, Tex., January 27-29, 1954.

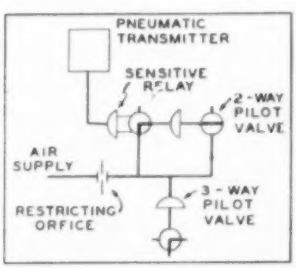


Fig. 1—Pneumatic interlock.

The complete interlock as applied to a particular process is shown in Fig. 2. In this system the interlock is actuated by either of two ratio computers or by remote manual switches. Because wiring and electrical switches were already installed, the remote manual operation of the interlock was made electrically actuated. However, the solenoid valve can be replaced with a diaphragm-operated valve.

Operation of the interlock vents the air from the diaphragms of the three-way pilot valves in the line from the positioner to the cylinder operator of the process control valves and from the diaphragm of the four-way pilot valve which controls the purge valve. Pressure switches actuate an audible and visual alarm to indicate which variable tripped the interlock. The alarm system is independent of the interlock.

Reset . . . The first three-way plug cock shown was installed to permit operation of the process control valves during startup before proper operating values are established and to permit resetting the interlock after it has operated. In the "off" position, this three-way plug cock admits air to the diaphragm of the two-way pilot valve to close the vents from the two vent valves. Air is also supplied through the first three-way plug cock to a second three-way plug cock to permit operation of the process purge valve independently when the interlock is in the "off" position. A pressure switch energizes a visual alarm to indicate the position of this "on-off" plug cock.

When the interlock has been operated automatically, the first three-way plug cock must be turned to the "off" position to permit operation of the process control valves.

Properly sized orifices are installed in the vent ports of the three-way pilot valves to regulate the closing speed of the process control valves, thus insuring proper sequence of operation.

Other variations . . . The interlock shown is only one of a number of variations possible. Additional variables can be made to operate the system by adding relays and two-way pilot valves. Additional process control valves can be incorporated in the interlock by adding three-way pilot valves. Various sequencing arrangements can be provided with slight changes in the piping arrangement.

Three installations of the interlock described have been made at the Victoria plant. All have operated reliably with no failures to date.

The over-all operating time from energizing the sensitive relay to complete closing of the process control valves is 1.6 seconds when the control valves are wide open and 0.7 second when the control valves are in their normal operating position. Practically all of the operating time required is due to the closing speeds of the process control valves.

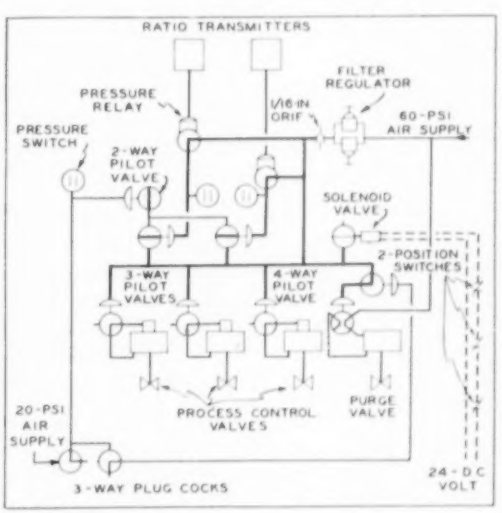


Fig. 2—Pneumatic interlock.

ONE OF A SERIES

OF SHOP TALKS

BY

JOURNAL EDITORS

Why does the Journal cover the entire petroleum industry?

With the oil and gas industry so big and complex, wouldn't the Journal do better to specialize on just a part of it?

Nope, not at all. Our readers like our across-the-board coverage. They tell us that our all-industry viewpoint is our most valuable feature.

Take yourself, for example. You are a specialist in some branch of the industry — say geology, or natural gasoline, or drilling. Sure, you have to keep up with the technical development and operating methods in your specialty. Maybe that's the main reason you're reading the Journal right now.

But if you're going to get ahead in this fast-moving business, you've got to know how things in your department fit in with what's going on in other divisions of the industry. You've often noticed that a new development in one division is soon adapted to your own operation, so it's important to keep tabs on what others are doing.

And if you're an executive — or hope to be—you need to follow everything that may affect company policy, including economic trends, new construction, political influence, what other companies and areas are doing, and trends in one branch that may cause a shift of activities in another branch.

Specialization is fine, up to a point, but don't let it fence you in. The more specialized the industry becomes, the more necessary it is to preserve the over-all picture. Only the Journal fills this need. It's our studied editorial policy to view the industry as a whole, maintain a balance, and keep things in their proper perspective.

No matter what your job is, you're a part of the whole far-flung petroleum industry. Reading the Journal keeps your horizon broad.

THE OIL AND GAS JOURNAL

by **W. L. Nelson**
Technical Editor

Metals for Low Temperature

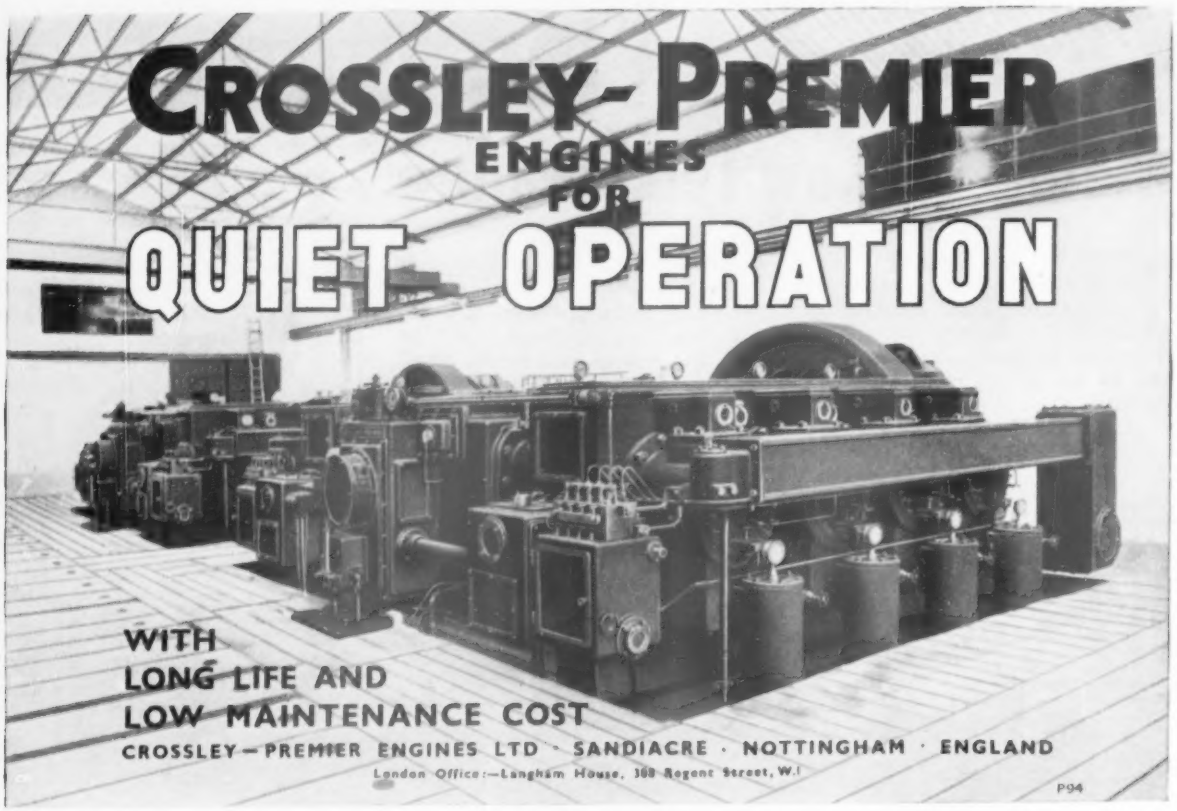
ALTHOUGH heat treatment or condition has some effect on the impact strength of metallic materials (especially steels), chemical composition is the primary consideration. As will be seen in the accompanying tabulation, the single-phase or solid-solution alloys such as the nickel and manganese (or copper) iron alloys; nickel or manganese steels; austenitic chromium nickel steels (low carbon); monel metal, Inconel, etc.; and the pure metals, are all suited for low-temperature strength or ductility. Minute amounts of impurities or alloying agents, such as carbon in steel; copper, manganese, silicon, etc., in aluminum alloys; or carbide precipitating elements such as chromium, molybdenum, vanadium, etc., which can separate from the major matrix of a steel, are greatly detrimental to low-temperature shock resistance. A Charpy impact strength of 15 ft.-lb. at the lowest working temperature is thought to be adequate for nearly all situations.

APPROXIMATE IMPACT STRENGTHS OF MATERIALS AT LOW TEMPERATURES

	Approx. chem. composition, per cent					Charpy impact strength (ft.-lb.) at these temperatures, °F.									
Material—	Ni	C	Cu	Cr	Mn	70	0	—20	—35	—50	—75	—100	—150	—310	—423
Iron	0.61	0.01	0.48	0.68	0.65							53.0	60.0	3.0	
Carbon		0.15				168.0	127.0	108.0	90.0	28.0	5.0	5.0			
Carbon		0.22				124.0	122.0	121.0	118.0	90.0	5.0	low			
Carbon		0.48				24.0	14.0	12.0							22.0
Lead		(commercial)				11.0									
Cast iron*						28.0						23.0		16.0	
3.3 Ni cast iron*	3.3					38.0						22.0		19.0	
Cr-Ni cast iron*	2.5			0.54		32.0						24.0		18.0	
Ni-Mo cast iron*	1.5			0.47		50.0						64.0		28.0	
Ni-Mo cast iron*	1.75			0.75		57.0						63.0		36.0	
Ni-Resist—Type 1*	14.0	3.0	6.0	2.0		100.0						100.0		90.0	
Ni-Resist—Type 2*	20.0			2.0		120.0+						120.0+		91.0	
Ni-Resist—Type 3*	30.0			3.0		115.0						78.0		74.0	
Ni-Resist—Type 4*	30.0			5.0		84.0						79.0		77.0	
Cr-Ni bolting		0.4	(0.2 Mo)	1.0	0.65								20.0		
2110 (Old)	1.5	0.10													
Normalized						68.7	70.0	72.5	64.2						
Quenched						22.8	20.9	20.7	24.3						
Drawn 810° F.						38.7	38.1	38.0	37.5						
Drawn 1,150° F.						67.7	70.0	79.5	74.5						
2175 (Old)	1.5	0.75													
Normalized						12.4	7.0	7.0	5.8						
Drawn 1,150° F.						25.6	21.0	15.6	17.4						
2 Ni Steel	2.0	(low)													
Normalized						43.6	32.5	30.0	24.2						
Drawn 810° F.						28.4	31.2	31.5	28.0						
Drawn 1,150° F.						55.1	57.8	53.2	52.0						
2320	3.5	0.20													
Normalized						41.0	31.0	29.5	25.5						
Drawn 440° F.						27.9	29.9	29.5	27.7						
Drawn 810° F.						37.8	38.5	38.5	38.0						
Drawn 1,150° F.						56.1	65.0	64.0	65.0						
2375 (Old)	3.5	0.75													
Normalized						14.8	12.7	13.2	13.7						
Drawn 1,150° F.						23.0	23.4	22.0	21.5						
1 per cent Ni casting	1.03	0.12			0.65	73.0						8.0	2.0		
2 per cent Ni casting	2.02	0.14			0.65	68.0					25.0	13.0	5.0		
3.5 per cent Ni casting	3.5	0.13			0.65	74.0						27.0	15.0		
4 per cent Ni Casting	3.75	0.05			0.65								20.0		
4 per cent Ni casting (0.5 Moly)	4.05	0.08	(Va. 0-16)	0.3									20.0		
5 Ni steel	5.0					55.0	53.0			52.0		50.0	46.0	10.0	
8½ Ni steel	8.5					45.0	40.0			41.0		39.0	37.0	24.0	
Heat affected near weld		(Type 310 rod)												18-19	
13 per cent Ni steel	13.0					35.0	34.0			34.0		33.0	33.0	30.0	
A.I.S.I. 2800	8.6	0.10			0.77	44.0						42.0		23.0	
14 Cr steel annealed		0.19		13.31	0.45	45.0	25.0	10.0			4.0				
18 Cr steel annealed		0.08		17.95	0.46	3.0	2.0								123.0
Mang. chromium		0.11		9.9	17.7	185.0									45.0
Mang. chromium		0.09		16.9	9.4	115.0									22.0
Silicon (3.2 per cent) Mn-Cr	0.01	0.08		7.7	17.2	93.0									123.0
Mang. Cr-Ni	1.1	0.13		14.2	15.5	162.0									
18-8 Cr-Ni stainless	9.65	0.07		18.51		119.0				117.0		113.0		119.0	
Type 304 stainless	8-11	0.08		18-20		110.0	110.0			110.0	110.0			110.0	
Type 316 stainless	10-14	0.10		16-18	(2.5 Mo)	110.0	110.0			110.0	110.0			110.0	
Type 316 stainless	12.01	0.08		17.65	(2.74 Mo)									17-59	
18-8 (Ti) stainless	8.1	0.10		18.0		149.0									81.0
18-8 (W) stainless	8.5	0.11	0.2	17.7	(1.0 W)	134.0									112.0
Type 310 stainless	21.6	0.11		27.2										25-50	
25-24 Cr-Ni stainless	24.4	0.24		25.0		84.0									59.0
36 Ni iron	36.0	0.04				120.0									73.0
40 Ni alloy	40.0					25.3						27.6		27.0	
Inconel (6.5 Fe) annealed	78.5	0.08	0.2	14.0	0.25	236.6						268.0		187.0	
Cold drawn						69.0								61.0	
"H" Monel (cast)	65.0	0.10	29.5		0.9	44.0								47.0	
Monel—Annealed	67.0	0.15	30.0	(1.4 Fe)	1.0	216.0							216.0		
Forged						187.0							187.0		
Cold drawn						135.0							135.0		
Cast						70.0	90.0						90.0		
Nickel	99.0					179.0									123.0
Copper			99.96			56.0									73.0

*Izod impact on 1.2-in.-diameter bar struck 3 in. above support.

CROSSLEY-PREMIER ENGINES FOR QUIET OPERATION



WITH
LONG LIFE AND
LOW MAINTENANCE COST

CROSSLEY—PREMIER ENGINES LTD · SANDIACRE · NOTTINGHAM · ENGLAND

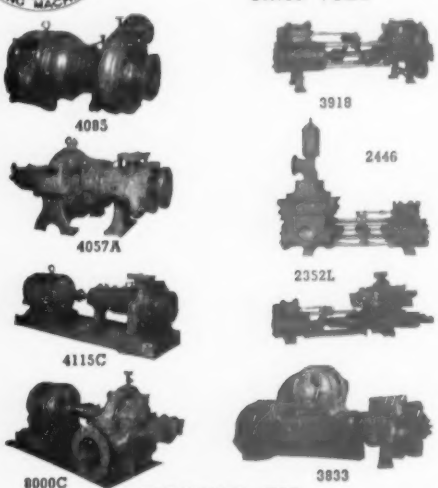
London Office:—Langham House, 308 Regent Street, W.1

P94

PUMPS

CENTRIFUGAL
RECIPROCATING

BUILDERS OF OUTSTANDING PUMPS
Since 1869



ESTABLISHED 1869

DEAN BROTHERS PUMPS INC.
INDIANAPOLIS IND.
323 W. TENTH ST.

SHIPPING WORRIES

GOT YOU SINGING THE BLUES?

WE'LL STRIKE A CHEERFUL NOTE FOR YOU

When shipping has you moanin' low . . . call The Tulsa Crating Company for any or all of these services:

PACKAGING for export or domestic shipment.
SCIENTIFIC PROCESSING against corrosion, moisture, air dust, all climatic conditions.
DOCUMENTATION: Preparing and forwarding documents needed for export shipping.
AIR SHIPPING: As agent for International Air Transport Association we arrange all details of shipment by air.
COUNSELING on details of export shipping.

TULSA CRATING CO.
519 SO. ROCKFORD • TULSA 10, U.S.A.
PHONES 3-6482, 3-3492

Low-Temperature Fractional Analysis—2

by J. F. Wilson

EQUATIONS 1 and 2 given in the preceding installment are the basic equations for the calculation of an analysis from the experimental data. They may be simplified in certain cases. For example, with manual equipment only one component is normally collected in a receiver and the initial receiver pressure is zero or very close to this value. Consequently, Z_1 in Equation 1 becomes unity and the use of Equation 2 is not necessary.

The order of magnitude of the error introduced by ignoring the effect of compressibility factors is indicated by the following example taken from Preston's paper on calculating methods.[1] Suppose a receiver at 100° F. contains propane at a pressure of 200 mm. and isobutane is added until the pressure reaches 400 mm. If compressibility factors are taken as unity the pressure term in Equation 1 used to calculate the volume of isobutane collected is 400 — 200 = 200 mm. If the correct compressibility factors are used, the term becomes

$$\frac{400}{.9877} - \frac{200}{.9960} = 203.2 \text{ mm.}$$

A detailed account of the calculating method developed and used at the school has appeared in the literature.[1]

Calibration . . . One of the basic factors affecting the accuracy of analysis by low-temperature fractional distillation is the accuracy of the calibrations of the volumes in the receiver system. Several methods have been used to determine the receiver volumes. It was found at the school that the greatest ease of reproducibility and probably the greatest accuracy was obtained when the volume was determined from the weight of the water required to fill the receivers. There is one precaution to be observed with this method. For the greatest accuracy it is necessary to consider the buoyancy effect of air upon the water being weighed. For a 1-gal. receiver the buoyancy correction is approximately 4½ g. or over .1 per cent of the total volume and, hence, a significant correction. The volume of the manifold leading to the bottles is most conveniently determined with a gas burette. This will be the preferred method in the N.G.A.A. instruction manual on low-temperature fractional analysis, but several alternate methods will also be included.

It is interesting to note that Podbielniak, Inc., neglected the air-buoyancy correction in the calibration of its receivers; however, it also made an error of an approximately compensating size in determining the volume of the manifold, so that the over-all volume calibration as supplied by Podbielniak agreed quite well with that determined on the Podbielniak apparatus at the school.

Vapor holdup . . . The N.G.A.A. testing program pointed out the fact that low results were normally obtained upon the lowest-boiling component in a given mixture. This has been attributed to neglecting the effect of vapor holdup in the distillation. When a cut point in the distillation is indicated by the temperature at the thermocouple at the head of the column, some of the component is still between this thermocouple junction and the shutoff valve, and is not in the receiver system to be measured. This constitutes vapor holdup.

A method for accurately determining vapor holdup was developed at the school and the method has been published in the literature.[2] Because the temperature of the gas varies from the dew-point temperature at the thermocouple to nearly room temperature at the shutoff valve, it is impractical to calculate the vapor holdup from apparatus dimensions alone. The amount of holdup will vary with the temperature at the head of the column and, accordingly, with components being distilled. On the fully automatic Podbielniak column used at the school, the magnitude of this vapor holdup varied from approximately 15 standard cc. of gas for methane to approximately 12 for pentane. The effectiveness and accuracy of this holdup correction is indicated from the analytical results obtained at the school. The known sample at the school contained 1.51 mole per cent propane as the most volatile component. Using the vapor-holdup correction determined at the school, consistently accurate results were obtained. In general, the accuracy for propane was within plus or minus one-tenth of 1 per cent.

Liquid holdup and apparatus modifications . . . Because the gas at the measuring junction of the thermocouple at the head of the column is at a dew point, any cooling of the column section above the thermocouple junction will result in condensation of liquid from the gas stream. If this occurs, liquid holdup exists in the column. This type of holdup must be eliminated as it is not correctable by calibration. At the school liquid holdup was removed by making a change in the condenser section of the Podbielniak column. How this change was made will be discussed in the next installment of this series.

Author is research engineer, Union Oil Co. of California. Paper presented at C.N.G.A. meeting.

References

1. Preston, S. T., Petroleum Refiner 32, No. 8, 109 (1953).
2. Preston, S. T., Petroleum Refiner, 32, No. 4, 142 (1953).

Call your
BUTLER
distributor—
be sure of.....

OIL-TIGHT

bolted steel tank erection

IN YOUR LOCATION:

UNION TANK AND SUPPLY COMPANY

Fort Worth, Texas	Abilene, Texas	Wichita, Kansas	Denver, Colorado
Houston, Texas	Dallas, Texas	Plainville, Kansas	Sterling, Colorado
Odessa, Texas	LaFayette, Louisiana	Great Bend, Kansas	Casper, Wyoming
Alice, Texas	New Orleans, Louisiana	Tulsa, Oklahoma	Newcastle, Wyoming
Midland, Texas	Dubach, Louisiana	Oklahoma City, Oklahoma	Powell, Wyoming
Nocona, Texas	Glendive, Montana	Hobbs, New Mexico	

AMERICAN PIPE AND SUPPLY COMPANY
Casper, Wyoming Denver, Colorado Cut Bank, Montana

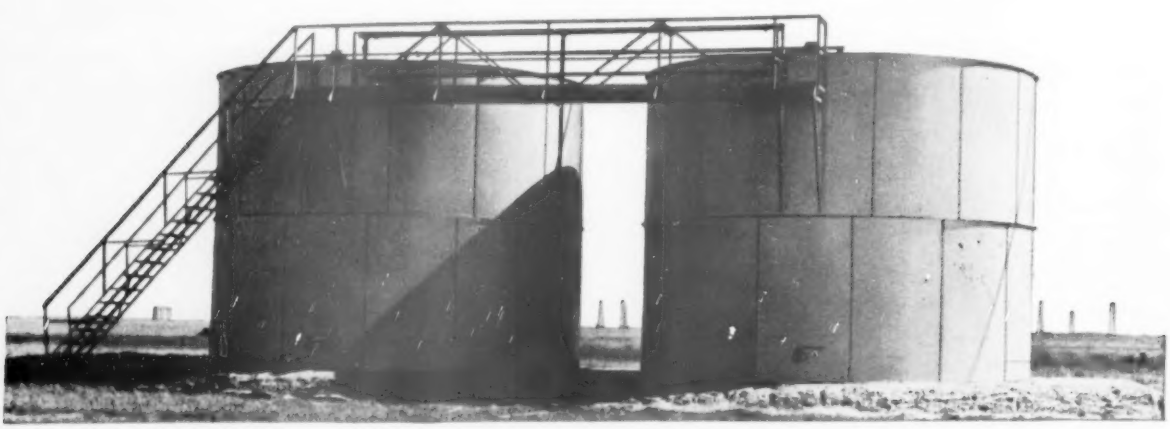
HARRY G. MILLER
El Dorado, Arkansas

Trained crews with years of oil field experience quickly erect the precision-made sheets of Butler bolted steel oil tanks. Every bolt is tightened just right, pulling the sheets against the accurately prepunched rubber gaskets. As a result, every joint is made positively oil tight.

And, as a result, Butler bolted tanks require little attention, stay good looking for years.

Be sure of getting oil-tight bolted tanks—erected when you need them. Call your nearby Butler distributor.

Butler stairways and walkways are easy to assemble and will give years of servce. They fit all A.P.I. bolted tanks and may be used in many other ways.



BUTLER STEEL PRODUCTS

BUTLER MANUFACTURING COMPANY
7464 East 13th Street, Kansas City 26, Missouri

Manufacturers of Oil Equipment · Steel Buildings · Farm Equipment · Cleaners Equipment · Special Products
Factories located at Kansas City, Mo. • Galesburg, Ill. • Richmond, Calif. • Birmingham, Ala. • Minneapolis, Minn.

How to Determine Diluent in Used Railway Diesel Lube Oils—2

by L. L. Davis and H. E. Luntz

AN example of the graphic correlation is given in Fig. 1. It was prepared from blends of a railway diesel engine oil with three diluents having characteristics as shown in Table 3.

TABLE 3—PROPERTIES OF NEW OIL AND SYNTHETIC DILUENTS

	Vis. at 100° F., cs.	P.M. flash (°F.)
New diesel engine oil	232.8	380
Winter diesel fuel (kerosine)	1.452	140
"All-year" R.R. diesel fuel	2.864	192
Average A.P.I.-B. of M. R.R. fuel	2.99	172
Diluent representing 50 per cent residue from diesel fuel oil	3.812	250
Diluent representing 25 per cent residue from diesel fuel oil	5.971	315

The kerosine was used as representative of the lightest fuel which might be encountered. The diesel fuel oil was a commercial "all year" railroad diesel fuel. The "heavy diluent" was the 25 per cent residue or bottoms produced by distillation of the diesel fuel oil and is characteristic of the diluent found in used diesel engine oils from normal operation.

Correlation . . . Referring to Fig. 1, the scales represent the decreases in flash and viscosity caused by the diluent. The nearly parallel flat curves are lines of constant per cent diluent, and the three curves indicate the character of the diluent (as defined by the above three types).

To estimate the amount and kind of diluent in a sample of used oil, the flash (Pensky-Martens, °F.) and the viscosity (centistokes at 100° F.) are determined on the used oil and the decrease in flash and viscosity calculated by subtracting the measured values from the values for the unused oil. The point on the chart represented by the decrease in flash and viscosity indicates the per cent of diluent, and the position along the viscosity line in relation to the diluent lines indicates its general character.

Three blends . . . As a check on the chart, three blends of the diesel engine oil were made with (1) 3 per cent of the heavy diluent, (2) 5 per cent of kerosine, and (3) with both diluents totaling 8 per cent. The three circled numbers on the chart represent the measured decreases in flash and viscosity for these three blends. The maximum error is only about 0.2 per cent. It is particularly interesting that blend (3) shows 7.9 per cent on the chart, and the location along the 8 per cent line indicates the presence of very light material characteristic of kerosine.

Errors . . . An examination of the chart discloses the errors which may result from use of either the flash or viscosity alone as an estimation of the amount of diluent. As an example, a decrease in flash of 40° F. may be caused by about .5 per cent kerosine, 1.5 per cent diesel fuel, or 20 per cent of the heavy diluent. In like manner, a decrease in viscosity of 100 cs. might be caused by about 10 per cent of the heavy diluent, 7.7 per cent diesel fuel, or 6 per cent of kerosine.

A correlation similar to Fig. 1 is true only for a new oil having the given flash and viscosity characteristics. Appreciable variation from these new oil tests will cause appreciable error. As an example, if the viscosity of the base oil increased 10 cs., the error at 5 per cent dilution would be about .5 per cent and at 20 per cent dilution about 3.5 per cent. A 20° increase in flash would result in errors of 0.3 per cent to 0.7 per cent at the same dilution level. Normal commercial tolerances in a given brand and grade of oil will not cause significant differences.

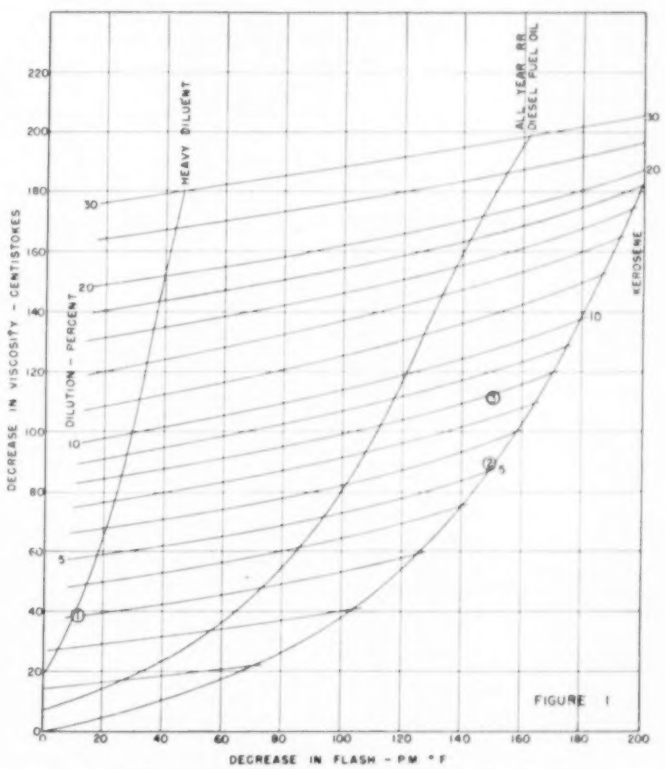


Fig. 1—Dilution of diesel engine oil. (Flash 380° F., viscosity 233 cs.)

Authors are with development and research department, Continental Oil Co., at Ponca City, Okla.

ELECTRIC LOGGING—25

True Resistivity Values

by R. I. Martin

ANOTHER example of a more complex case will now be considered. Referring back to Fig. 1 of Installment 18 (repeated here), Sand 2 is the thickest sand. The presence of Sands 1 and 3 will exert some influence, so that the departure curves for beds of finite thickness will give only an upper limit for Rt. This upper limit should not be very far from the exact value because the shale breaks are reasonably thick.

The sketches at the bottom of the figure show the experimental points plotted on the departure curves for e/d = 15.

Coordinates of these points are:

$$\frac{AM}{d} = 1.62 \qquad \frac{Ra}{Rm} = \frac{18}{0.92} = 19.5$$

$$\frac{AM'}{d} = 6.5 \qquad \frac{Ra}{Rm} = \frac{18}{0.92} = 19.5$$

In this particular case, it is known that the porosity of the sand is high, and that the formation factor is about 10. It is likely also that invasion may be shallow so that the curves for Di/d = 2 have been used. From the left-hand sketch it appears that Rt/Rm is approximately equal to 30, so that Rt is about 27 ohm-m.

In the right-hand figure curves for Ri/Rm = 6 have been used. Although the agreement is not as good, an answer of the same magnitude is obtained.

A second point of interest in the figure is an evaluation of the lateral curve opposite Sand 4. When a resistivity peak and a blind zone may be recognized the following relation applied:

$$\frac{Ra\ (max)}{Ra\ (min)} = \frac{Rt}{Rs}$$

Author is assistant professor of petroleum engineering, Missouri School of Mines and Metallurgy.

where Ra (max) is the resistivity of the peak and Ra (min) is the resistivity of the blind zone. This is a theoretical relation, if the bore hole effect is neglected.

When the mud column is taken into account the ratio Ra (max)/Ra (min) becomes smaller than Rt/Rs. Nevertheless, it provides better values of Rt than if the value Ra on the log is used. The error increases as Rt/Rs increases. The value for the expression:

$$\frac{Ra\ (max)}{Ra\ (min)} \times Rs$$

will give a lower limit for Rt.

For an invaded bed, with Rt higher than Ri, the maximum apparent resistivity is only slightly lower than it would be if the bed were not invaded. The ratio Ra (max)/Ra (min) again gives a lower limit for Rt/Rs but is lower than in the case of noninvaded beds.

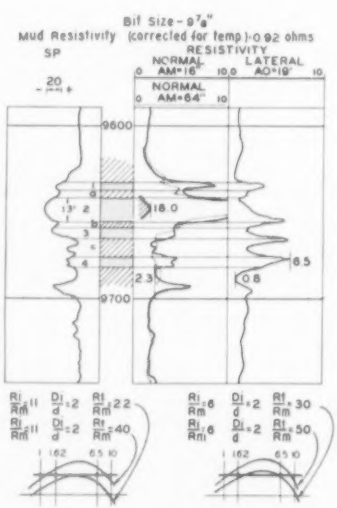


Fig. 1—A section of a well bore which penetrated four sands shows the appearance of the two normal curves and the lateral curve related to the actual formation. (Courtesy Schlumberger Well Surveying Corp. Document 4.)

It Rt is lower than Ri, the following consideration appears reasonable. The presence of an invaded zone, more resistive than Rt, tends to increase Ra. At the same time the presence of the surrounding shales, more conductive than Rt, tends to decrease Rt. As the spacing is larger than the bed thickness, the influence of the adjacent formations is likely to predominate. Consequently Ra is almost certainly lower than Rt, and the above expression will apply.

This is true when the spacing AO = 35 d so that the radius of investigation is large enough to overcome the effects of invasion. In the case of shorter spacings caution must be used in applying the formula.

It should be emphasized that the blind zone must be apparent on the log. This occurs when the bed thickness is less than seven-tenths of the electrode spacing.

Bed 4 in the figure fulfills this condition and:

$$\frac{Ra\ (max)}{Ra\ (min)} = \frac{6.5}{0.8} = 8.1$$

The resistivity of the shale is 2.3 ohm-m so that a lower limit for the resistivity of Bed 4 is about 8.1 × 2.3 or 18.6 ohm-m.

It was said earlier that for a correct application of the departure curves for beds of finite thickness, it is necessary to make sure that the ratio Rt/Rs is higher than a limit value. Consideration of the expression Ra (max)/Ra (min) which is readily obtained from the log gives a quick method of checking that the condition is fulfilled. If, for example, e/d = 15, then if Rm is not approximately equal to Rs, Rt/Rs should be at least equal to 7. If Ra (max)/Ra (min) is equal to 7 or higher than 7, then Rt/Rs is still higher so that the condition is amply satisfied.

EQUIPMENT MEN . . . in the News

Zink Heating Seminar is Planned for April

More than 300 engineers and operating personnel from the process industries of the country are expected to

JOHN ZINK

R. D. REED

attend the Fourth John Zink Process Heating Seminar to be held Saturday April 24 at the John Zink plant, Tulsa, according to John S. Zink, owner of the company.

Organized and directed by Robert D. Reed, chief engineer of John Zink Company, the seminars are designed to cover special subjects of interest to process groups which are not normally included in the programs of meetings of technical societies and associations.

Registration for this year's seminar will begin at 11:00 a.m. The meeting, which will be held at the plant, will open at 1:00 p.m.

Invitations to the seminar along with confirmation of intent to attend are required because the closing portion of the program provides a buffet dinner for the entire group as guest of John Zink. Engineers from the process industries are urged to obtain invitations and attendance confirmation cards from either the home office of John Zink Company, or from Zink representatives in the field.

Gulf-Canal Consummates Ship Operating Plans

At a special meeting of the stockholders and directors of Gulf-Canal Lines, Inc., S. C. Trimble was elected president and a director of the corporation, and Edgar W. Brown, Jr., and B. L. Morris, Orange, Tex., were named to the board of directors.

This action came as a result of an operating agreement entered into between Gulf-Canal Lines, Inc., Houston, and Higman Towing Co., Orange, towards a merger of the two companies.

Higman Towing Company, since 1918, has engaged in the transporting of petroleum and petroleum products. It was one of the first firms to serve the offshore drilling operations, and by this operating agreement have agreed to furnish the necessary tugs to provide the motive power for Gulf-Canal Lines, Inc., operation.

By the operating agreement entered into with Higman, Gulf-Canal Lines, Inc., now is ready to handle liquid and dry cargoes in packages or in bulk to all points on the Gulf Intracoastal Waterways, its connecting ship channels, and tributary waterways. By joint through rates and interchange equipment arrangements with other common carriers, it is in position to handle these commodities to ports on the Mississippi River from New Orleans to Minneapolis; the Missouri River from St. Louis to Sioux City, Iowa; the Illinois Waterways to Chicago; and barge load lots only to ports on the Ohio, Tennessee, and Monongahela Rivers.

Wheland Names Huffhines As Sales Representative

Grover H. Huffhines has been appointed sales representative for Wheland Co., Chattanooga, Tenn., one of the nation's oldest manufacturers of slush pumps, rotaries, swivels, traveling blocks, and draw works. Huffhines is a graduate of Texas A. & M. College and has been associated with major supply companies since 1936. He will represent Wheland in the West Texas area.

Oilwell Announces Changes In Central Midwest Area

Ten personnel changes in the Central Midwest area of U. S. Steel's Oil Well Supply Division have been announced by V. J. Waters, area manager.

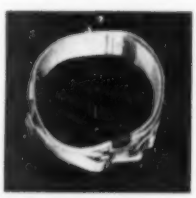
D. M. Clark was named manager of Oilwell's branch store at McCamey, Tex., and H. S. Tipton was named field representative at the same city. Clark joined Oilwell in 1947, and prior

with SUPER-TOUGH

McDonald

SAFETY BELTS

TYPE R—Derrickmen's Belt—Adjusts from 28" to 48"—weighs 1 lb. 13 oz., 3" body pad. D ring remains in same relative position regardless of size to which belt is adjusted.



TYPE S—Insta-Release Derrickmen's Belt—Adjusts from 28" to 48"—weighs 1 lb. 10 oz., 3" body pad. Insta-Release buckle lets wearer free himself instantly.

Leather parts on both belts silicone treated to maintain flexibility—waterproof, acid resistant. Metal parts are drop forged and Magnaflux tested to detect and discard those with even the most minute flaws.

WRITE FOR BULLETIN & PRICES

B-F-McDonald COMPANY

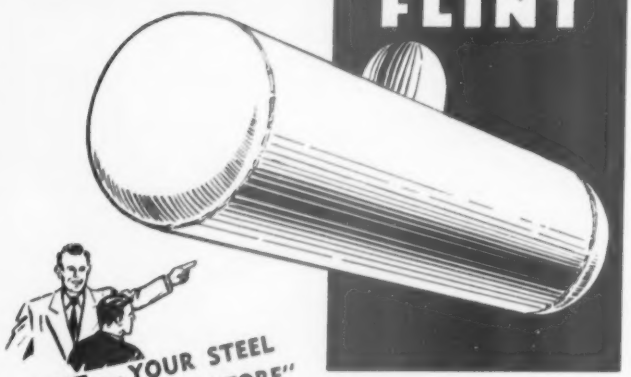
Manufacturers & Distributors of Industrial Safety Clothing & Equipment

5721 West 96th St., Los Angeles 45

Other Offices in San Francisco and Houston

want Steel?

CALL FLINT



"FLINT — YOUR STEEL DEPARTMENT STORE"

A COMPLETE SERVICE:
STEEL
FABRICATION
ERECTION
DETAILING

Practically any industrial steel product or fabrication facility you need is conveniently secured at Flint! GALVANIZED and STRUCTURAL steel for heavy construction jobs, transmission towers; WAREHOUSE steel including hot and cold rolled bars, sheets and structural shapes; PLATE steel for petroleum processing and chemical equipment.

SERVING SOUTHWEST INDUSTRY SINCE 1915

FLINT STEEL CORPORATION
TULSA MEMPHIS

PAGE FENCE-Since 1883

• AMERICA'S FIRST WIRE FENCE •

• Page Chain Link Fence, pioneered by Page and made only by Page, is quality controlled from raw metal to erected fence. Whether you choose heavily-galvanized Copper Bearing Steel, or long-lasting Stainless Steel, or corrosion-resisting Aluminum, you'll have a rugged fence on sturdy metal posts deep-set in concrete. Choose any one of 8 basic styles, varied by heights, types of gates, posts, top rails and barbed wire strands for extra protection. And to be sure of reliable workmanship your fence will be expertly erected by a specially trained firm. For helpful Page data and name of member nearest you . . .

Write to PAGE FENCE ASSOCIATION in Monessen, Pa., Atlanta, Bridgeport, Chicago, Denver, Detroit, Los Angeles, Philadelphia, New York or San Francisco.

PRODUCT OF PAGE STEEL & WIRE DIVISION OF AMERICAN CHAIN & CABLE COMPANY, INC.

to his latest appointment he was a field representative at Big Spring, Tex., and Hobbs, N. M. Tipton held various store and field positions with the division before his McCamey appointment.

Named district representative at Midland, Tex., was R. W. Pittman, who is transferring from Alice, Tex., where he was district merchandise manager. A native Texan, he has been employed by Oilwell since 1936 in the sales and merchandising departments. J. O. Donaldson was named city representative at Midland, Tex. All of Donaldson's service with Oilwell has been in the West Texas district.

At Monahans, Tex., J. C. Sage, employe of the branch store there, was appointed field representative at that city. Sage joined the division in 1949 at the Odessa, Tex., store. R. V. Clayton has been appointed field representative at Odessa, the same post he has held at Wichita Falls, Tex., since joining Oilwell in 1953.

Mac Gunn, Jr., who has been employed at El Dorado, Ark., since he became associated with Oilwell in 1951, has become field representative at that city. At Shreveport, Lewis H. Cogburn has been appointed field representative. He has been with the Oilwell organization since 1950 in a similar capacity at El Dorado.

Charles V. Black was named city representative at Abilene, Tex. He has been located at Abilene since his employment by Oilwell in 1946. James G. Harvey, who has been located at Graham, Tex., since joining the division in 1951, was appointed field representative at that city.

Hughes Awards Service Pins to Veterans

A lot of drilling history has been written since these men first represented Hughes Tool Co. in the oil fields. W. H. Siems, general sales manager, a 28-year Hughes man himself, is shown presenting R. L. Long, manager of the southern region, with a 30-year service pin. W. L. Hunter, manager of the northern region, left, was presented with a 25-year service pin at the same time. The occasion was the recent meeting of Hughes Tool Co.'s regional managers in Houston.

Cardinal Chemical Adds Two to Nocor Sales Force

Two new members have been added to Nocor sales force by Cardinal Chemical, Inc., Odessa, Tex. They are Jim C. Orchard and Frank Jones.

J. C. ORCHARD

FRANK JONES

Prior to joining the Nocor sales staff, Orchard was office manager of Famosa Branch, Roscoe Moss Co., steel fabricators of Los Angeles.

Jones has been located for the past year at Odessa, Tex., as a sales representative for Pacific Pumps, Inc. He will return to California to operate from Bakersfield.

Johnston Pump Elects Hugh Glen as President

Hugh Glen was elected president of Johnston Pump Co., effective April 1, 1954, at a special meeting of the board of directors of the company. He succeeds Mrs. Thomas W. Simmons, who has resigned as president, but is still sole owner of the firm. Glen was formerly president of Emsco Derrick & Equipment Co.

Dresser Industries Buys Site for Expansion Program

Dresser Industries, Inc., Dallas, has taken the initial steps of a long-range expansion program in the Tulsa area, involving ultimate capital expenditures of more than a million dollars with the signing of a purchase agreement covering approximately 15 acres in the new Sheridan industrial district.

Consummation of the agreement has been announced by J. B. O'Connor, executive vice president of Dresser Industries.

Centrally located near many important Mid-Continent oil, gas, and chemical equipment markets, Tulsa was deemed ideal for all of the varied Dresser industrial activities by O'Connor and other Dresser executives who took part in the preliminary survey.

While final plans will be developed to fit the Dresser companies' eventual needs, the immediate program calls for the construction of a modern brick office building and a warehouse building. Construction of this initial building is to start as soon as these plans are approved.

Clark Bros., of Olean, N. Y., one of the largest Dresser operating companies, and leading manufacturers of electric, steam, and gas engine-driven compressor, will move into these new quarters early this summer. Regional sales and service engineering offices and warehousing, together with a complete parts depot, will be set up by Clark immediately upon completion of these new facilities.

As soon as present lease commitments expire, other Dresser subsidiaries will be relocated at the new Tulsa site. One of these, Pacific Pumps, Inc., Huntington Park, Calif., manufacturers of oil-well plunger pumps and a complete line of hot-oil, boiler-feed, and marine turbo pumps will likewise establish centralized regional Mid-Continent sales and service offices and reconditioning facilities for its line of oil-well plunger pumps, as well as Mid-Continent regional sales offices for Pacific's centrifugal pump line.

Dresser's over-all long-range plans include the eventual construction of additional service, warehouse, and office space in three more units comparable to the original Clark building. Dresser also plans to locate manufacturing fa-

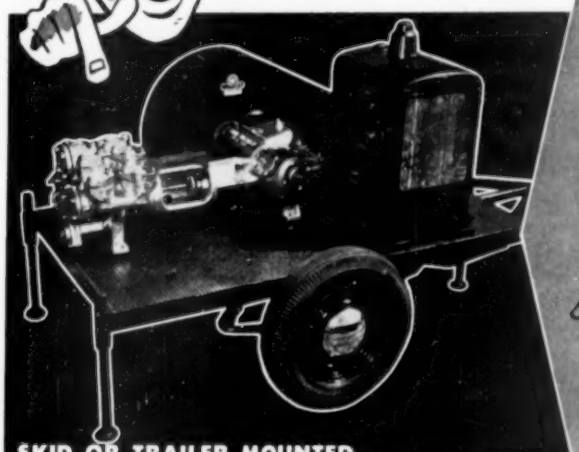
WHEATLEY'S

OVER 1,000 NOW IN USE!

heap BIG little 3½"X5"

FOR: • OIL • MUD • ACID • SALT WATER • WATER FLOODING

Here's one you won't give back to the Indians! It's terrific for those specialized pumping jobs that have been worrying you. Why invest more money than is necessary for 20 H.P. down to 5 H.P.?



SKID OR TRAILER MOUNTED

PORTABLE

FLEXIBLE

VERSATILE

RUGGED

REPLACES 4" x 6" FOR MOST PURPOSES

Piston	Stroke	BPH	PSI	HP	Wt. Lbs.	Plunger Load
2"	5	35	900	15	700	2500#
2½"	5	56	520	15	700	
3"	5	83	350	15	700	
3½"	5	115	255	15	700	

- HERRINGBONE GEARS
- REDUCING LINERS
- POT TYPE FLUID END
- NO ROD OVERLAP
- ANTI-FRICTION BEARINGS
- CONTROLLED LUBRICATION

SAVE $1,000 BY USING 3½"X5" INSTEAD OF 4"X6"

WHEATLEY PUMPING UNITS AVAILABLE THROUGH:

- Charles Wheatley Cos.
- Franklin Supply Co.
- J. & L. Supply Co.
- United Supply Mfg. Co.
- Walker Neer Co.
- D. T. O'Conner Co.
- Wheatley Equipment & Supply, Limited

DRAKE WHEATLEY PUMPS & VALVES TULSA 1, OKLAHOMA

CAUGHT IN THE ACT OF SAVING A LIFE!

High speed photographs of a 3-lb. pipe wrench dropped from 14 ft. prove that Bullard's *exclusive* ribbed crown construction gives an added margin of safety, and exceeds standard 40 foot pound drop tests.

BULLARD ALUMINUM SAFETY HATS & CAPS

"Shorty" cap

Only metal safety cap manufactured. Flared brim protects ears and neck, but does not interfere with carrying or working in close quarters.

"ROUGH-NECK" hat

Weighs only 12 ounces. Universal headband can be adjusted to any standard size in two minutes.

EVERYTHING BULLARD IN SAFETY

HARD BOILED

T. M.'S REG. U. S. PAT. OFF.

FREE— write for illustrated folder

Since 1898

E. D. BULLARD COMPANY

275 Eighth Street, San Francisco 3, California

Distributors Throughout The World

cilities on this site, which may eventually occupy a total area of several hundred thousand square feet.

Browning Made Director By Mountain Fuel Supply Co.

V. A. BROWNING

Val A. Browning, Ogden, Utah, president, Browning Arms Co., has been elected a new director of Mountain Fuel Supply Co. The announcement was made by W. T. Nightingale, Mountain Fuel Supply president, following a meeting of company directors in Salt Lake City.

Browning, whose father was the late John M. Browning, famous gun inventor, spent a year at Fabrique Nationale d'Arms de Guerre, Liege, Belgium, studying firearms manufacturing and learning French. Returning to America, he studied engineering and law at Cornell University.

Dowling Named Kellogg Advertising Director

The appointment of Arthur L. Dowling to the newly created position of director of advertising for The M. W. Kellogg Co., subsidiary of Pullman, Inc., has been announced.

M. W. Kellogg specializes in the design and construction of large processing plants for the petroleum and chemical industries. The company also produces a wide variety of industrial materials and equipment, including special super alloy steels, Kel-F fluorocarbon plastics, high-pressure piping, heat exchangers, and pressure vessels.

Dowling was formerly advertising and sales promotion manager for the Chemical Division of Celanese Corp. of America, and earlier was connected with advertising activities of U. S. Industrial Chemicals Co.

Republic Supply Opens Fort Morgan Store

The Republic Supply Co. has opened a new store in Fort Morgan, Colo., in the Julesburg basin area.

The new store will serve the areas of northeastern Colorado, southeastern Wyoming, and southwestern Nebraska. Morris Gilmore will be store manager, moving from the Republic store at Farmington, N. M. C. M. Carrington has been promoted to manager of Republic store at Farmington.

Welex Jet Services Opens Tulsa Office

W. L. CARWILE

The recent opening of the Tulsa offices of Welex Jet Services, Inc., at 308 Midstates Building, has been announced by W. L. (Bill) Carwile, Jr., Oklahoma division manager for the oil-well service organization. The new offices will coordinate the sales and services of Welex throughout the division, and at the same time maintain better contact with district offices at Shawnee, Ardmore, Stillwater, and Pauls Valley, Okla., and Great Bend, Kans. Welex will continue to maintain offices at Oklahoma City under C. R. Parker, assistant division manager.

Carwile, who has been with Welex for 5½ years, went to work as a roughneck in 1934 for G. H. Vaughn Drilling Co., Ada, Okla., and worked up through tool pusher to driller. As a seabee during World War II, Carwile was assistant drilling superintendent at Elk Hills Naval Petroleum Reserve No. 1.

Lane-Wells Opens Two New Truck Stations

To serve customers better in the Gulf Coast area, Lane-Wells Co. has opened two new truck stations, bringing the total number of offices and branches in the United States and abroad to 92.

J. W. Cobble has been transferred from Beaumont to be operator in charge of the new truck station at Liberty, Tex.

A new truck station has also been opened at Vivian, La. E. V. Cleveland, operator in charge, was formerly at Magnolia, Ark.

Golner Promoted to Sales Manager by Hammel-Dahl

The promotion of David Golner to sales manager has been announced by Hammel-Dahl Co., Providence, R. I., manufacturers of automatic control equipment.

After graduating from Brown University in 1942 with a degree in mechanical engineering, Golner became associated with Curtiss-Wright Aircraft Corp. He joined Hammel-Dahl in 1945 as a development engineer. Since that time he has been closely affiliated with all phases of manufacturing, sales, and management.

WHAT PUT MAGCOBAR ON THE BEST SELLER LIST?

There is only one answer when products for the oil industry consistently gain wider and wider use and acceptance year after year. The answer is: outstanding performance, day after day under any and all circumstances.

Magcobar has been built on a solid foundation of highest quality products, good service and fair and reasonable prices. With faith in its record, Magcobar has continually reinvested a major portion of its income in additional facilities to serve the oil industry. When you need drilling mud products today, you can be sure of the quality when it's in a Magcobar bag.

Magcobar

MAGNET COVE BARIUM CORPORATION
HOUSTON, TEXAS
ONE OF THE DRESSER INDUSTRIES

KOBE

IS ONE OF THE DRESSER INDUSTRIES

An important member of the family of Dresser Industries since 1945, Kobe Inc. Division of Dresser Equipment Co., of Huntington Park, California, today plays a vital role in reducing operating costs for oil producers everywhere. Kobe's hydraulic oil well pumping system, featuring the famous Free Pump, has revolutionized production techniques with resultant savings on labor and equipment costs.

MAGNET COVE BARIUM CORP., Houston, Tex., Malvern, Ark. Magcobar drilling mud, Magcogel bentonite, Mylojel, Fiber Seal, Jel-Oil mud.

CLARK BROS. CO. DIVISION, Olean, New York. Engines and compressors—gas, steam and diesel driven.

DRESSER MANUFACTURING DIVISION, Bradford, Pa. Oil and gas pipe couplings, fittings and sleeves—rolled and welded rings—welded fittings and flanges.

KOBE, INC., DIVISION, Huntington Park, Calif. Complete hydraulic oil field pumping systems, including the Kobe Free Pump.

What is the DRESSER plus+?

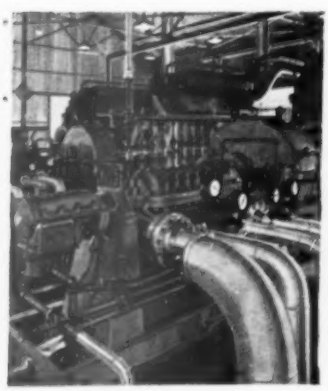
The Dresser Plus is the extra *service* you get when you deal with any Dresser company. It is an added advantage for you which stems from Dresser's unique overall organization. For Dresser is many companies with a single purpose—to provide the growing oil and gas industries with operating equipment that is *second to none*.

Each company in the Dresser group functions independently within its own specialized field—yet each can draw from the total resources, in manpower, research, and know-how, of the combined Dresser operations. When you work with any of the Dresser companies, all of the facilities of Dresser are *at your service*.

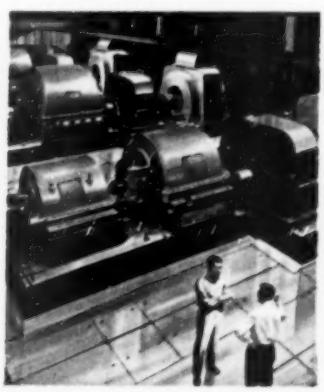
Planned, coordinated specialization—company by company—"one for all and all for one"—that is the DRESSER PLUS +

Kobe's Free Pump, adapted from the original hydraulic pumping system, hydraulically "runs" and "pulls" the bottom hole pump, allowing pumper to handle pump changes without service crews or equipment required by other pumping methods. The advantages due to operating and installation cost savings are further amplified by many extra features which include positive paraffin control, easy and quick bottom hole pressure surveys and wide-range well regulation.

DRESSER INDUSTRIES, INC.
OIL, GAS AND CHEMICAL EQUIPMENT
ATLANTIC BUILDING ★ DALLAS, TEXAS



PACIFIC PUMPS, INC., Huntington Park, Calif. Centrifugal pumps, deep oilwell plunger pumps, hot oil and boiler feed pumps.



ROOTS-CONNERSVILLE BLOWER DIVISION, Connersville, Ind. Rotary positive blowers, gas pumps, centrifugal blowers, exhausters; positive displacement meters.

SECURITY ENGINEERING DIVISION, Whittier, Calif., Dallas, Tex. Rock bits, reamers, casing scrapers, reamer rock bits, coring bits, Securaloy.

IDECO DIVISION, Dallas, Beaumont, Tex. Derricks, drawworks, rambler drilling rigs, traveling blocks, rotary tables.

5 GOOD REASONS

WHY GOODALL LONG-LIFE ROTARY HOSE IS YOUR BEST BUY!

STRENGTH
FLEXIBILITY
LONG LIFE
ECONOMY
REPAIR SERVICE

This combination of important features is the reason why more and more Goodall Long-Life Rotary Hose with the Barney Coupling is being specified every day. Maximum initial life is assured by the Goodall design which has proved the strongest, most flexible rotary hose ever built. And with Long-Life Rotary Hose, your investment is protected by Goodall's exclusive **maintenance**. If your Long-Life hose should meet with an accident, the Barney Coupling can be reset to make your hose as good as new for the rest of its normal life. Add to these sound features the fact that this extra value cost no more than ordinary rotary hose and you can readily see why Goodall Long-Life Rotary Hose is your best buy. Available through all supply stores.

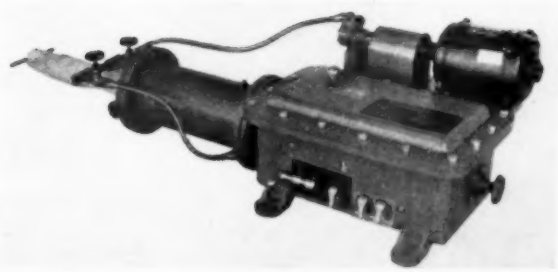
GOODALL RUBBER COMPANY
TRENTON, N. J.

GOODALL RUBBER COMPANY OF TEXAS: Houston, Odessa, Texas
GOODALL RUBBER COMPANY OF CALIFORNIA: San Francisco, Los Angeles, Seattle, Salt Lake City, Portland
GOODALL RUBBER COMPANY: New York, Philadelphia, Pittsburgh, Chicago, Denver, St. Paul, Detroit
EXPORT: Goodall Rubber Company, Trenton, N. J.
STOCKING DISTRIBUTORS: Houston Oil Field Material Co., Wilson Supply Co., Iverson Supply Co.

. . . What's New in Equipment?

Use the handy Time-Saver Cards ✓✓✓ to obtain additional information on these items

by Dan B. Miller



Sampler Takes Continuous Samples

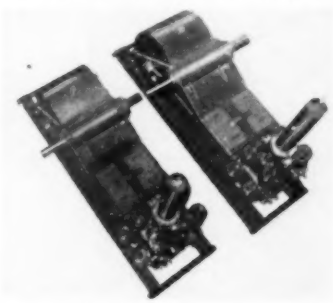
A pipeline sampler fulfilling A.P.I. requirements, complete with piping and wiring, and operating from either a flow meter or period timer, is of rugged construction throughout with heavy-duty cast-iron explosionproof pump motor and junction box. It is designed for use in Class 1, Group D hazardous locations.

The Class 840, Type B-1 pipeline sampler takes a continuous sample in small increments. It takes samples from the line under pressure, holds sample from line under line pressure, and gives true solids and water content of the sample. The sampler gives true sample for gravity determination. *Nelson Electric Manufacturing Co.*

Check No. 1 On The Time Saver Card

●

Higher Horsepower Ratings Announced for Mud Pumps



Increased horsepower ratings have been added to Gardner-Denver line of GX power mud pumps. Extensive tests and experience in the field, under actual operating conditions, were given as the basis for the revised ratings. The 7¾ by 18-in. Model GXR is now rated at 825 b.hp. at maximum speed of 65 r.p.m. The 7¾ by 16-in. Model GXP is now rated at 625 b.hp. at maximum speed of 70 r.p.m.

These increased horsepower ratings apply to Gardner-Denver GX pumps already in use in the field, as well as to new pumps now being manufactured. Field experience has demonstrated that ratings were too conservative on GX models already in the field. *Gardner-Denver Co.*

Check No. 2 On The Time Saver Card

●

Sonic Device Provides New Exploration Service

A new exploration service, designed to provide detailed information about the vertical velocity of sound-energy travel through subsurface formations, was invented and developed by Magnolia Petroleum Co.

The continuous velocity logging is accomplished by running a sonic device on a conventional well-logging cable. This device consists of an ultra-sonic signal generator, which emits pulses at the rate of 20 to 30 per second. The generator is separated from the signal receiver unit by a 5-ft. acoustical insulator.

The receiver unit detects the pulse and provides information for the measurement of travel-time between the transmitter and the receiver. These times versus depth are plotted by a special recorder. Since the formation velocity is nearly always higher than that of the fluid in the hole, the first arrival of energy at the receiver is that which has traveled along the "least time path" of the sidewall formation. Therefore, the instrument continuously records the interval-velocity of the formation between the transmitter and the receiver with respect to depth.

The service equipment consists of a conventional seismic recording unit for well-shooting and the velocity recording panel. An oscilloscope is used for a continuous check on logging accuracy. *Seismograph Service Corp.*

Check No. 3 On The Time Saver Card

●

New Hydraulic Pump Gives Almost Constant Flow

A new 6-ft. stroke hydraulic pumping unit has been successfully field tested, and several already are in operation. An almost constant oil flow is possible because the unit combines a fast downstroke with a slow upstroke, thus increasing volumetric efficiency of the subsurface pump. The hydraulic reversal valve assures a gentle reversal action, which is easy on sucker rods.

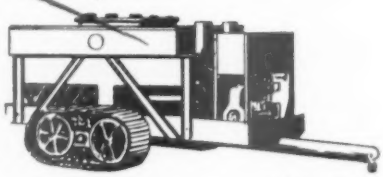
A relief valve is placed in the discharge line of the positive displacement pump. It supplies positive protection against excessive pressure buildup caused by surface or subsurface equipment.

The unit tripod attaches to the bottom of the base, the cylinder into the top portion, and the reverse valve assembly attaches to one side. Both power

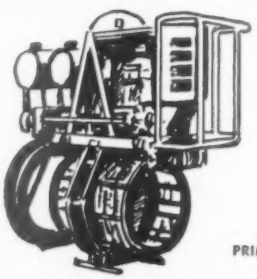
the men who know pipelining best . . .

go for Crose

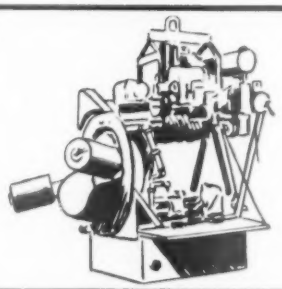
PIPELINE EQUIPMENT



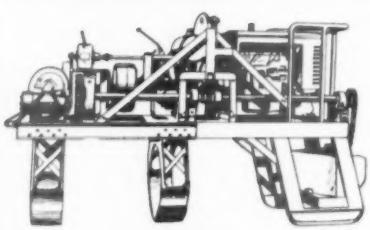
CROSE-LITTLEFORD PIPELINE KETTLES



CROSE CLEANING & PRIMING MACHINES



CROSE COATING & WRAPPING MACHINES



CROSE ROAD BORING MACHINES

Every piece of Crose equipment has been field-proven to give dependable and efficient service under every pipeline condition.

Pipeliners "go for Crose" equipment because they know it is built to take a lot of punishment — and yet give efficient service. Yes, it's built by men who know pipelining — and know what features pipeliners are looking for. From one end of the line to the other you'll find Crose equipment doing a better job and holding up when the going is tough.

Manufacturing Company, Inc.

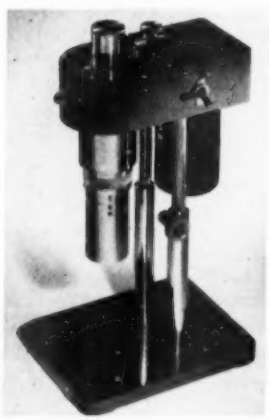
and exhaust fluids are ported through the cylinder base. An important feature is the ability to assure adequate pressure at lower reversal, which assures operation of the pilot valve.

The reverse and pilot valves are both hydraulically operated. Only three pressure lines feed into the pilot valve. One is internally constructed to one end and two to the other end. Each of the pressure sources operate on different areas.

Tripod base allows spacing of the subsurface pump by insertion of subcouplings between the well and unit polished rod. One leg of the base is used for porting high-pressure fluid, while a second leg carries discharge fluid from cylinder base back to the fluid reservoir. *Axelson Manufacturing Co.*

Check No. 4 On The Time Saver Card

●



Fann V-G Meter for Field Drilling Fluid Measurement

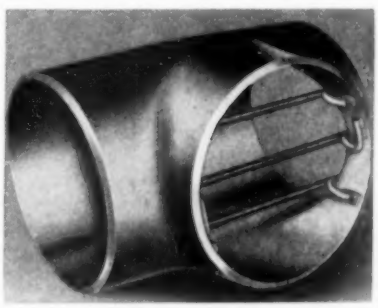
The Model 34 direct reading Fann V-G meter offers a new concept of the field measurement of drilling fluids. From a single dial, the two components that make up apparent viscosity are separated, evaluated, and gel strength determined. These values are in absolute units.

Apparent viscosity, the value obtained by a conventional single speed instrument, is composed of two properties; yield point and plastic viscosity, each acting independently to affect flow. Since each of these properties responds to a different treatment, it is essential to know their values for useful mud control. This new direct reading V-G meter measures these properties accurately, only a simple calculation is required.

The unit operates from six volts a.c. or d.c., and is self-contained and completely portable. Two speeds, 300 and 600 r.p.m., are made available by a positive, quick-acting gear shift, and a governor shorting switch provides a maximum stirring speed of about 1,200 r.p.m. For durability and ease of cleaning, polished-chrome and brown hammertone enamel have been used on all exterior surfaces. *Geophysical Machine Works.*

Check No. 5 On The Time Saver Card

●



Welding Tee Fences In Wandering Pigs

Difficulties frequently arise when the pigs reach side outlets or branches, which they have an inclination to enter. Pigs of the compressed wire brush type may be seriously damaged at these points. To aid pipeliners in solving the irksome problem of wandering pigs, Tube Turns has made available a tee equipped with alignment bars.

The bars are made from heavy wall pipe and shaped to provide flexibility. They follow the elastic movement of the tee as pressure is applied, and there is no tendency to break attachment welds. *Tube Turns.*

Check No. 6 On The Time Saver Card

●

Sight-Glass Liquid Doesn't Cloud or Leave Deposits

A new fluorochemical liquid for use in sight glasses of force feed lubricators has long useful life and does not become cloudy or leave deposits on the surface of the glass.

Called Fluorochemical "101," the new fluid is completely inert and therefore will not extract the additives used in modern lubricating oils. The liquid is colorless, odorless, nonflammable, and has no known effects on the skin or body.

As a result, use of Fluorochemical "101" eliminates the periodic removal for cleaning of sight glasses used on force feed lubricators. Therefore, both maintenance time and costs previously required for cleaning can be greatly reduced, if not virtually eliminated.

Fluorochemical "101" is available in half-pint, pint, quart, and gallon quantities. An 8-oz. bottle of the new liquid will fill 10 lubricators of medium size, *Minnesota Mining & Manufacturing Co.*

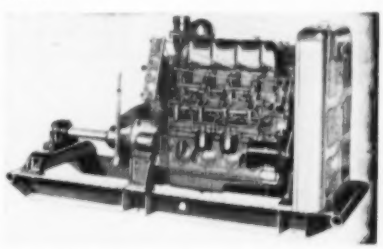
Check No. 7 On The Time Saver Card

●

Improved Diesel Features Greater Power Output

A complete line of 2-cycle diesel engines features 36 per cent greater power output. While of the same basic design as former models, the new higher-performance engines carry 52 major advancements and refinements. Operating speed has been increased to 1,800 r.p.m. Compression ratio of all models is 16 to 1, and bore and stroke are 4.5 by 5.5 in.

Cylinder assembly is completely redesigned for improved efficiency and longer service. More efficiency and complete scavenging, achieved by a new valving arrangement and redesigned porting which imparts greater turbulence, adds to performance. Increased power ratings also result from the greater volume of air now supplied all cylinders by new blower construction.

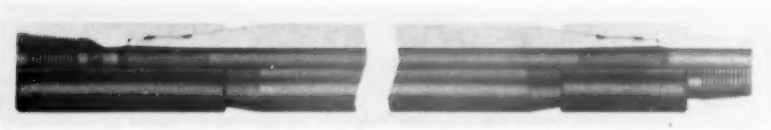


Cooling capacity has been increased through the enlargement of water passages and the addition of new channels in vital areas. The entire liner now receives uniform cooling.

Horsepower ratings for the new models at 1,800 r.p.m. range from 58 to 255. Displacement is 87 cu. in. per cylinder. The 6-cylinder model weighs 1,800 lb., for 7.06 lb. per horsepower. The 4-cylinder model weighs 1,500 lb., with 8.33 lb. per horsepower. For the 3 and 2-cylinder engines the figures are 1,190 and 975 total weight, 9.30 lb. and 12.50 lb. per hoursepower. *P&H Diesel Engine Division, Harnischfeger Corp.*

Check No. 8 On The Time Saver Card

What's New... Use the handy Time-Saver Cards



Drill Collars Individually Engineered

Rol-Flex replaceable end drill-collar design utilizes the outstanding features of the straight-grip drill-pipe tool joint, but each size has been individually engineered with no consideration of interchangeability with a drill-pipe tool joint.

The rotary shouldered connections have the thread roots (box and pin) work-hardened by the Rol-Flex method. This is done by means of a hardened and ground thread roll that has a profile that corresponds to the profile of thread being rolled. The correct pressure for work hardening the root is applied by a hydraulic fixture designed for this purpose.

A Rol-Flex thread also has an antigalling characteristic due to the fact that while the root of the thread is being rolled, the position of the thread roll burnishes the pressure flank of the thread. With the added protection of microizing, it is almost impossible to gall Rol-Flex connection. *American Iron & Machine Works Co.*

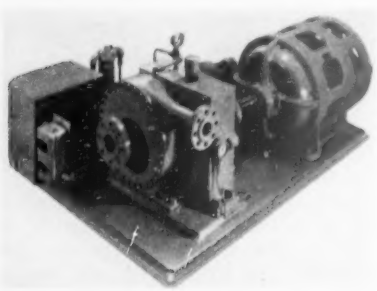
Check No. 9 On The Time Saver Card

●

Compressor Features Interchangeable Parts

Centrifugal recycle compressor in standard models will meet all recycle requirements in a range from 25 to 250 hp., flows as low as 100 cu. ft. per minute, pressure as high as 600 psig., and temperatures up to 700° F. The company stresses the standardized design of impellers, housing, diffusers, bearings, gears, and shafts, which are interchangeable to meet the special requirements of the user.

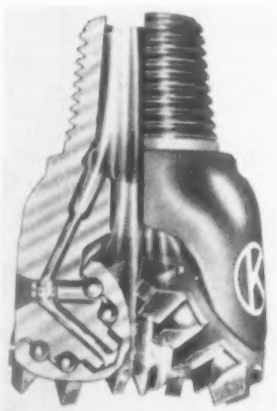
The flexibility of the basic machine is increased through the availability of three impeller designs having different aerodynamic characteristics.



A high pressure impeller is designed for service in a wide range of operation from approximately 50 per cent below to 20 per cent above design flow. The nonoverloading impeller is designed for conditions where flow requirements are variable and complete overload protection is required. The nonsurging impeller, designed for a wide range of operation, is completely stable from design point to zero flow. *Sawyer Bailey Corp.*

Check No. 10 On The Time Saver Card

●



Air Blast Bit Is for Soft, Medium, or Hard Formation

A new Air-Blast rock bit, manufactured in 4¼, 4½, and 4¾-in. sizes, penetrates soft, medium, and hard formations. The bit is made of high nickel-alloy steel forgings providing maximum wear resistance. These bits are designed for roughest conditions in air drilling.

Called K Bits, they are made with three-piece shank construction for maximum cone support; solid antifriction bearings (double ball combination against locking and greater thrust); and with pilot pin supported with long wearing, high-resistance alloy. Large diamter of cones and long teeth give high speed and footage under all drilling conditions. *Williams Machine Co., Inc.*

Check No. 11 On The Time Saver Card

●

New Silencers Eliminate High, Low Frequency Noise

Series "ADS" Acoustic Discharge Silencers are designed to eliminate high and low frequency noises caused by high velocity discharge from steam and air devices. The new silencers operate on a snubbing principle, and employ especially designed acoustic reactance chambers plus special sound absorbing material.

The new silencers are for use on steam vents, steam safety valves, hogging jets, gas turbines, air nozzles, evacuating ejectors, and similar devices discharging high velocity steam and air into the atmosphere.

Series ADS is available in three models: ADSO for optimum silencing in critical areas; ADSS for the type of silencing required in semiresidential and light industrial areas; and ADSC for commercial silencing in noncritical areas. All models are available in standard 8 to 30-in. pipe size, but special sizes are available upon request. *Burgess-Manning Co.*

Check No. 12 On The Time Saver Card

●

Cleaning Material Designed For Steam-Generating Unit

Oakite Composition No. 93 is specifically designed for use in steam-generating equipment and in steam guns where the solution is siphoned from an auxiliary tank.

The material is a white, free-flowing powdered material which is readily and completely soluble in water in a broad range of concentrations and use. It possesses exceptionally high sequestering ability and, when added to water up to 20 grains hardness, will show no precipitate or turbidity. Normal working concentrations range between ¼ and 4 oz. per gallon of water, into which the material is sprinkled and stirred until dissolved. Solutions of Composition No. 93 are nontoxic and usually safe and pleasant for steam gun operators to use, since no offensive odors or unpleasant fumes are given off. *Oakite Products, Inc.*

Check No. 13 On The Time Saver Card

●

They're NEW

- Bulletins
- Catalogs
- Brochures

for your copy, check ✓ ✓ the Time-Saver Cards.

Pennsylvania Aircheck Valve. Bulletin 509-D describes its benefits to all users of compressed air and gases because it is easily installed and provides advantages not obtainable elsewhere. *Pennsylvania Pump & Compressor Co.*

Check No. 14 On The Time Saver Card

●

Sandfrac, a treatment to increase oil production from low-solubility formations is visually described in a new two-color brochure. The method is illustrated by means of sectional formation diagrams. A table of results obtained from various formations and at different locations is featured. *Dowell Incorporated.*

Check No. 15 On The Time Saver Card

●

New First Aid Catalog contains complete information and photographs of 16 different types and styles of Safety Green first-aid kits including the new pocket kits. An entire page of 70 different unit first-aid packs is included so that any combination desired can be picked with ease. All first-aid kits are available with any assortment of these unit packs to fit the accident patterns of the specific industry. *E. D. Bullard Co.*

Check No. 16 On The Time Saver Card

●

Chemical and Process Equipment, Steel and Alloy Plate. A new, eight-page catalog, illustrates and describes a comprehensive line of standard and custom-made chemical and process equipment, and steel and alloy plate vessels. The literature is well illustrated and is divided into basic product sections for ease of reference. Highlighted are products engineered for such operations as agitation, distillation, evaporation, and heat transfer. *The Colonial Iron Works Co.*

Check No. 17 On The Time Saver Card

●

pH Control in Industry. An informative report on the role of automatic pH (acidity) control in industry has been published to help process engineers and chemists better understand this important technique. The 12-page brochure gives a picture of continuous pH recording and control in three major processing areas, water treatment, control of chemical reactions, and waste disposal. Simplified diagrams and sketches describe typical pH installations for a variety of processes, with emphasis on improved product quality, better process efficiency, and lower material and maintenance costs. *Beckman Instruments, Inc.*

Check No. 18 On The Time Saver Card

●

Air-Operated Butterfly Valves. Bulletin 1701 contains specifications of Continental Butterfly valve bodies and the new Series 800 diaphragm motor operators. Complete tables of allowable pressure differentials are included to facilitate selection of properly sized bodies and operators. *Minneapolis-Honeywell Regulator Co.*

Check No. 19 On The Time Saver Card

●

Soil Resistivity Meter. Bulletin 105A describes construction, operation, and application of Model 243A Soil Resistivity Meter, available with a scale calibrated to read directly soil resistivity up to 30,000 ohm-cm. *Associated Research, Inc.*

Check No. 20 On The Time Saver Card

●

Oil Field and Pipeline Equipment is a new bulletin, graphically illustrated with application photographs on oilfield and pipeline equipment. Bulletin WP-1099-B42F contains specification information on many types of pumps, including those for water flooding; steam turbines and turbine-generators; oil, gas, and dual fuel engines; packaged oil-field compressors; various types of air and gas compressors; air tools and mechanical power-transmission equipment, including QD sheaves. *Worthington Corp.*

Check No. 21 On The Time Saver Card

●

Mudwonder Mud Valve Catalog. This new mud valve underwent 21 months testing on rigs in Oklahoma, Texas, and Louisiana. The Mudwonder offers eight advantages in mudline service. It cuts down-time; disassembles and assembles easily; keeps piping hookups fixed throughout drilling operation; seals drop-tight; operates easily and quickly; stops sanding; gives longer service; and reduces maintenance costs and labor. *Edward Valves, Inc.*

Check No. 22 On The Time Saver Card

TRADE MARK REG. U. S. PAT. OFF.
TIME TESTED
MACCO
GAS LIFT

Telephones:

VICTORIA
1058
3848

ALICE
4-4993
4-5787

BEAUMONT
5-1958
2-7637
ZF-78424

MIDLAND
3-3936

LAFAYETTE, LA.
8-9851
5-4479
4-2477

MACCO
OIL TOOL CO.
1521 PRINCE ST., HOUSTON 8, TEX.
UN-1253
MA-3557 MY-7571 MI-8T20
MO-5-6809 MI-9-0747 OL-1589

POSITIVE
OIL SHOW
IDENTIFICATION
with MINERALIGHT Ultra-Violet (black light)
Don't pass up possible pay! Make positive core identification checks with new model MINERALIGHT SL long wave ultra-violet lamp.
PROVED BEST BY TEST FOR OIL SHOW ANALYSIS!
Simple to operate. Lamp weighs only 1 lb. Models available for 110 volt AC or with adapter, 110 volt DC current. Battery operated model for field use holds lamp, has built-in viewer for daylight examination. Easily portable. Send for FREE brochure OG, "How to detect and analyze petroleum in oil surface samples with ultra-violet."
ULTRA-VIOLET PRODUCTS, Inc.
145 Pasadena Avenue, South Pasadena, Calif.

Fish For The Big Ones!
at San Blas, La Paz, Puerto Vallarta, Mazatlan, Guaymas, Manzanillo

Sanborn's
MEXICO PACIFIC
FISHING TRIPS
Write for folder
SANBORN'S
International Airport,
Brownsville, Texas

THERE'S AN INSLEY WORKING NEAR YOU

ON A PIPELINE PROJECT

The Insley Manufacturing Corporation has been manufacturing construction equipment since 1907. The Insley Line includes excavators and cranes, 5 to 30 ton capacity—crawler or rubber mounted. There's an Insley working near you on a pipeline project.

INSLEY MANUFACTURING CORP. • INDIANAPOLIS
wholly owned subsidiaries
THE MAXI CORPORATION, LOS ANGELES • SIX WHEELS, INC., LOS ANGELES

Spang Extreme Line Casing is the subject of 12-page Bulletin 400-A. Advantages of its integral joint design are illustrated in color. The bulletin shows depth recommendations for three grades and clearance advantages for eight sizes. *The National Supply Co.*

Chect No. 23 On The Time Saver Card

●

Coke Handling and Storage. A 23-page brochure describes the coke-handling methods developed for two midwestern refineries. All phases of the operation, from the coking unit to storage, to loading for shipment, are taken up in the discussion. *Sauerman Bros., Inc.*

Check No. 24 On The Time Saver Card

●

Platecoil Performance in 12 Heat Transfer Applications. A 12-company report on the use of Platecoils in a variety of process heating and cooling applications has just been published in a 20-page brochure. This bulletin shows how savings can be made through factual reports on the experience of companies who are making these savings. Reports run the gamut of heat transfer applications from alkaline stripping and Flexseal coating to tar transfer and quench oil cooling. *Tranter Manufacturing, Inc.*

Check No. 25 On The Time Saver Card

●

Light-Weight Processing and Heat Treating Equipment. A 24-page, multicolor brochure illustrates fabricating and manufacturing equipment along with a line of products including such units as bubble caps, complex custom built piping, return bends, furnace tubes, and thermocouple - protection tubes. *The Pressed Steel Co.*

Check No. 26 On The Time Saver Card

●

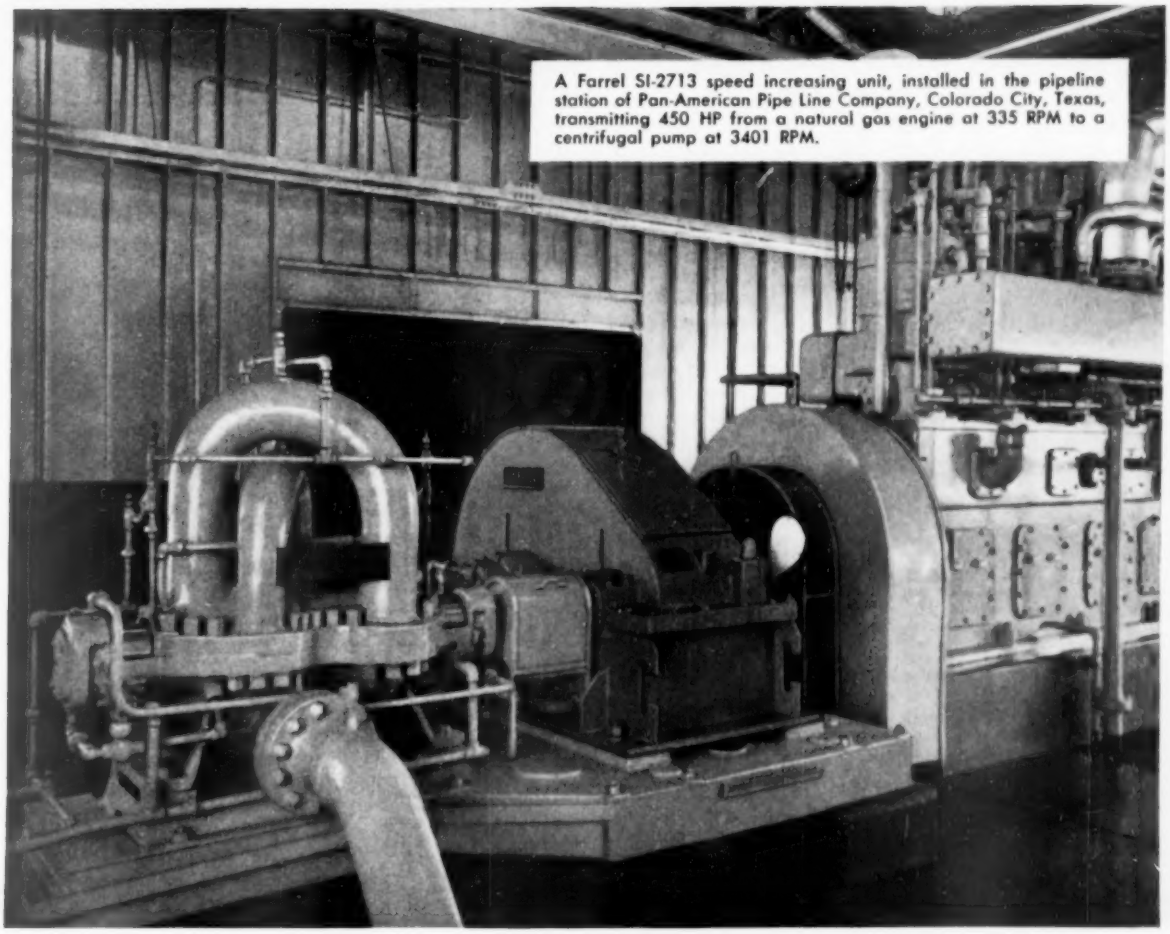
Pressure Regulating and Relief Valves. Product application tables, temperature and capacity data, and valve selection information is tabulated on a complete line of pressure-regulating and relief valves described in Catalog 207. Detailed line drawings on each model help to illustrate outstanding features. *Schade Valve Manufacturing Co.*

Check No. 27 On The Time Saver Card

●

Surveying Altimeters. Instruments for determining accurate elevations are described in this eight-page folder. The Micro and Terra Altimeters and the Barograph are illustrated. A full description of ranges, dimensions, accessories, and prices is also included. *American Paulin System.*

Check No. 28 On The Time Saver Card



A Farrel SI-2713 speed increasing unit, installed in the pipeline station of Pan-American Pipe Line Company, Colorado City, Texas, transmitting 450 HP from a natural gas engine at 335 RPM to a centrifugal pump at 3401 RPM.

Experience indicates that
22 years from now
this speed increaser will still be going strong

This is a standard Farrel speed increaser but it is unusual in an important respect. Its chances of continuing service through 1976, or years longer for that matter, are a normal expectancy.

In 1932, Farrel developed the first standard series of speed increasers for pipeline pumping service. Units in operation, including those originally furnished twenty-two years ago, now total over a quarter of a million horsepower. The performance of these speed increasers has been reported as highly satisfactory, and, as far as we know, no Farrel unit has ever been replaced.

In addition, service calls have been extremely few and far between, although many installations have been made out-of-doors, where they are subjected to such adverse conditions as continuous 24-hour operation, dust, rain, sandstorms, severe heat and intense cold.

For detailed information about these long-lived, maintenance-free units, send for Bulletin 448-A.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Boston, Akron, Detroit, Chicago, Memphis, Minneapolis, Portland (Oregon), Los Angeles, Salt Lake City, New Orleans.

OIL FIELD REPRESENTATIVES: Hercules-Lupfer Engine Sales Co., 124 N. Boston St., Tulsa 1, Oklahoma. V. W. Osborne, 860-A M & M Building, Houston 2, Texas.

Farrel-Birmingham

FB-911

Bos-co
FRICTION TYPE
STARTER
FOR HORIZONTAL ENGINES

ASK THE MAN WHO OWNS ONE
• Proven Performance • Safer
• More Compact and Economical
• Easier to Operate
Rubber covered pulley gives long wear, positive engagement.
Reduction gear eliminates jack shaft, V-belt drive and guard.
Available At Your Supply Store

Bos-co
EQUIP'T ENG'R'G & MF'G.
526 South Boulder Ave., Tulsa, Oklahoma

NATIONAL AIROIL
FUEL OIL - GAS
BURNERS SERVING INDUSTRY FOR 42 YEARS

- Steam Atomizing Oil Burners
- Mechanical Atomizing Oil Burners
- Low Air Pressure Oil Burners
- Rotary Oil Burners
- Industrial Gas Burners
- Combination Gas and Oil Burners
- Tandem Block Combustion Units
- Fuel Oil Pump Sets
- Refractory Burner and Muffle Blocks
- Valves, Strainers, Furnace Windows

Detailed information gladly sent you upon request, on your business letterhead.

Established 1912 — Incorporated 1917

NATIONAL AIROIL BURNER COMPANY, INC.
1236 East Sedgley Ave., Philadelphia 34, Pa.
S. W. Division: 2512 So. Blvd., Houston 6, Texas

REFINING

Trials Scheduled

Two small North Dakota refineries near completion

WILLISTON, N. D.—Two independent refineries, one here and the other at Dickinson, expect to begin trial runs later this month and go on stream by May 1, becoming the first operating refineries in the North Dakota portion of the Williston basin.

Williston Basin Refining Corp.'s 1,500-bbl. refinery here and Queen City Oil & Refining Co.'s 2,000-bbl. refinery at Dickinson are in the final phases of construction with all major vessels and installations in.

Late snowstorms have delayed work at Queen City's refinery, and completion of Williston Basin's refinery has been delayed by difficulty in obtaining special alloy steel for the catalytic reforming unit.

Both refineries have agreements with Stanolind Oil & Gas Co. for North Dakota crude. Orskey Brothers Petroleum Corp. of St. Paul, Minn., will market products from the Williston Basin refinery. Queen City has signed a contract with W. H. Barber Co. of Minneapolis for marketing about half its output and plans to market the remainder of its output through local outlets.

A third North Dakota refinery, the 30,000-bbl. refinery of Standard Oil Co. (Ind.) at Mandan, N. D., is scheduled to go on stream next fall.

Contract for Houdriflow Cracker Awarded by Sun

PHILADELPHIA.—Sun Oil Co. has awarded contract to Catalytic Construction Co. for the construction of a 27,000-bbl. Houdriflow catalytic cracking unit at its 85,800-bbl. refinery at Toledo, Ohio.

Work on the new unit, which will be part of a combination unit to process about 48,000 bbl. daily, will start immediately and is expected to be completed within 11 months.

Gulf's Fort Worth Refinery To be Closed Down May 1

FORT WORTH.—Gulf Oil Corp. revealed last week that it is closing down its 42-year-old refinery here May 1. The refinery in operation since 1912, reportedly has been operating at a loss for several years.

The plant has a crude charge capacity of 8,500 bbl. daily. Thermal operations total 4,000 bbl. daily. Refinery runs have been averaging about 7,000 bbl. daily recently.

J. W. Schriever, plant superintendent, said last week he knew of no plans for selling, salvaging, or otherwise disposing of the plant.

Refinery employes are being offered jobs elsewhere in the company organization.

Closing of the plant will leave Fort Worth with two refineries—both relatively small. They are Magnolia Petroleum Co.'s 12,000 bbl. plant and Premier Oil Refining Co.'s 7,800-bbl. installation.

Dakota Oil & Refining Co.'s Refinery Plans Abandoned

MINOT, N. D.—Dakota Oil & Refining Co., headed by Robert D. Tenison, Billings, Mont., has abandoned plans for construction of a 2,500-bbl. refinery here *(The Oil and Gas Journal, March 1, page 54)*.

Tenison said he was unable to negotiate a contract with Westland Oil Co. here for marketing products. A factor in Westland's decision not to market the products was the proposed use of Canadian crude in the refinery.

Tenison said he would not proceed with the refinery unless he had a 10-year contract for crude. He said he was unable to obtain the crude in North Dakota, but could get it from Redwater field in Alberta.

Coking Unit Work to Start At Carter's Billings Plant

BILLINGS, Mont.—Construction is scheduled to begin April 19 on a 3,000-bbl. fluid coking unit at Carter Oil's Co.'s refinery here.

The site has been cleared and all materials have been delivered. Fluor Corp., Ltd., the contractor, is expected to complete the project by October 1.

The unit will be the first of three commercial fluid coking units planned in the United States. It will operate on a new process designed to increase the output of gasoline, tractor, and diesel fuel from heavy residum feed stock. The process was developed by Standard

See Composite and Refinery Catalogs, or Write for Folder On

FLEET-LINE

PIPE SADDLES AND REDUCERS

Nozzle sizes from 1/4" to 24"

ASTM A234

Also for pressure vessel heads

Nominal pipe sizes 1" to 30"

Special sizes, lengths, schedules

ASA B16.9
ASTM A234

Eccentric

Immediate Delivery

STEEL FORGINGS, Inc.

P. O. Box 2768 • Shreveport, La.

Foot of Fannin Street

NEW! Write for Bulletin.

Patented

PIPELINE VENTS AND MARKERS

FLEET-LINE CO.

P. O. BOX 2768

SHREVEPORT, LOUISIANA

Write or Wire for Monthly Stock Lists

● VALVES

● PRESSURE TUBING

● STEEL

Peerless Supply Co., Inc.

L. D. 75 & 76 P. O. Drawer 36-A

Shreveport, La.

Oil Development Co. and first announced last August (*The Oil and Gas Journal, August 17, 1953, page 74*).

University of Michigan Short Course Set for June

ANN ARBOR, Mich. — A short course, "The Design of Distillation and Absorption Equipment," will be held July 12-23 by the department of chemical and metallurgical engineering at the University of Michigan college of enginering here.

The course, to be presented by Dr. Roger H. Newton of Badger Manufacturing Co. and Robert R. White and Brymer Williams of the university faculty, will cover such subjects as tray layout and hydraulics, azeotropic and extractive distillation, vapor-liquid equilibrium, and tray calculations.

Petrochemicals

Mississippi River Fuel Considers Petrochem Field

ST. LOUIS. — The construction of facilities to produce petrochemicals is "under consideration" by Mississippi River Fuel Corp., according to the firm's annual report to stockholders.

The company said Mathieson Mississippi Co., a subsidiary jointly owned with Mathieson Chemical Corp. which previously had been considering entry into the petrochemicals field, has been dissolved by mutual agreement with Mathieson.

Mississippi River Fuel still retains title to a 4,500-acre tract of land on the Mississippi River 35 miles south of here, held by Mathieson Mississippi for a possible plant site. The land was purchased last summer after the formation of the now defunct subsidiary in February 1953.

Construction of Furnaces For New Gulf Unit to Start

PORT ARTHUR, Tex.—Selas Corp. of America will begin work soon on eight radiant-heat furnaces in connection with a new ethylene unit to be built by Gulf Oil Corp. at its refinery here.

The new ethylene unit will more than double Gulf's present ethylene production here, raising output to nearly 15,000,000 cu. ft. daily (*The Oil and Gas Journal, February 22, page 121*).

Badger Process Division of Stone & Webster Engineering Corp. is the general contractor for the new ethylene unit.

"DEL" DESCO SAYS

DON'T LET THIS HAPPEN TO YOU!

USE DESCO LUBRICANTS

Valve operation should be easy, and it can be if you use DESCO LUBRICANTS and a DELTA GUN . . . and they make the matter of plug valve lubrication easy too!

WHY DESCO LUBRICANTS ARE BETTER!

DESCO LUBRICANTS are chemical compounds and not just plain greases. Each one is compounded to do a particular job and do it well. No fillers are used. No inert material. That's why there is no coking, no "hardening of the arteries." It also explains why DESCO retains all its lubricating qualities, and does not bleed or deteriorate in storage.

ONLY 4 DESCO LUBRICANTS HANDLE *ALL* VALVE SERVICES

That's right, only 4 DESCO LUBRICANTS will handle all the lubricated plug valves you have, no matter what their service—hydrocarbon, acid, caustic or LPG. Think what this means in reduced warehouse stocks and the possibility of using the wrong lubricant.

CONVENIENT STICKS OR BULK

Packed in clean, convenient sticks to fit Delta Gun, or in smaller sticks for jack screw lubrication, or in drums for volume lubricators.

Write for Valve Technical FILE

Complete data on lubricant services, conversion charts, and application of Delta-Desco Plug Valve Lubrication Equipment.

DELTA ENGINEERING SALES CO.

806 Louisiana Ave. Shreveport, La.

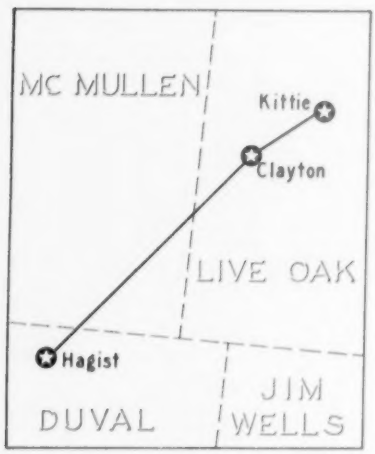
Sales Offices in All Principal Cities

DESCO

Plug Valve

LUBRICANTS

NATURAL GAS



Gas Units Working

Goliad puts three-plant processing setup on stream

CORPUS CHRISTI, Tex. — Goliad Corp. has placed in operation an unusual arrangement of field-processing installations, including a complete main gasoline plant, a remote absorption plant, and a gasoline plant for production of raw product.

Two of the plants are located in Live Oak County and the third is in Duval County. They process natural gas from the Kittie, Oakville - Wilcox, Harris, Coquat, Clayton, Goebel, and Hagist Ranch fields.

The Kittie plant, main unit of the arrangement and the complete gasoline plant, is located about half way between George West and Three Rivers in Live Oak County. It receives a rich-oil stream from the Clayton remote absorption unit, about 8½ miles to the southwest, also in Live Oak County.

The Kittie plant, which process the finished products, also receives raw make from the Hagist partial gasoline plant, located about 11 miles north of Freer in Duval County, as well as wet gas from nearby fields. Hagist plant is complete through the absorption facilities.

Pipeline system . . . The plants are interconnected, with two 6-in. lines running 8½ miles between the Kittie and Clayton plants, and one 4-in. pipeline connecting the Kittie and Hagist plants, located 40 miles apart.

An interesting feature of the arrangement is the remote absorption unit at Clayton, which consists of an absorber, rich-oil flash tanks, and a recompressor. Lean oil from Kittie plant is pumped to Clayton where it passes through the absorber and picks up hydrocarbons from the gas stream, and, as rich oil, is pumped back to Kittie for further processing.

At Hagist plant, dehydrated gas is processed with hydrocarbon vapors used as a stripping medium in the still. The raw make from this plant is then pumped to Kittie plant for final fractionation.

Goliad Corp. also expects to place its Wilcox plant in Lavaca County in operation late this spring.

Montana-Dakota to Build New Natural Gas Line

WASHINGTON.—Montana-Dakota Utilities Co. plans construction of 56 miles of natural gas pipeline to Hettinger and Stark counties, North Dakota, to supply gas to Regent, Mott, New England, and Lefor, N. D.

The company applied to the Federal Power Commission for permission to build the new line, and to build distribution systems in the four towns at an estimated cost of $728,854 for the entire project.

Columbia Gas Subsidiaries Get Gas Rate Increases

WASHINGTON. — Wholesale gas rate increases for four Columbia Gas System, Inc., subsidiaries and for a customer of one of them have been made effective by the Federal Power Commission.

In another action, the FPC scheduled arguments on rate proceedings involving one of those same companies and for two other Columbia Gas subsidiaries.

United Fuel Gas Co.'s increase was a substituted rate $1,578,938 lower than the $4,212,000 boost requested originally.

Ohio Fuel Gas Co. got an increase $387,500 lower than the $1,419,000 boost requested, and Central Kentucky Natural Gas Co. got an increase $117,500 less than the $559,200 boost asked.

Atlantic Seaboard Corp.'s increase amounts to about $3,000,000 per year, over rates accepted in a recent settlement of a prior rate case, and Roanoke Pipe Line Co., which purchases gas from Seaboard, got an increase totaling about $19,700.

Oral argument has been set for April 19 on rate boost proposals by Ohio Fuel for increases totaling $1,270,000 which has been in effect since February 1952 and $2,200,000 per year which has been in effect since December 1, 1952.

On April 22 arguments have been scheduled on increases of $2,200,000 and $1,343,000 annually which have been in effect since November 1, 1952, and October 25, 1953, for Manufacturers Light & Heat Co., and increases of $1,242,000 and $287,000, effective the same dates, for Home Gas Co.

Elk City Plant Expansion Work Nearing Completion

TULSA.—The second major expansion of Elk City, Okla., natural-gasoline plant, of which Shell Oil Co. is the unit operator, is nearing completion with most of the large equipment, including six compressor engines, a 62-ft. absorption column, and a 100-ft. fractionating column, now in place.

A shutdown of the gas-recycling plant and field production operations was necessary last week for the connection of the new equipment to existing facilities. Another shutdown about the first of May will be necessary to complete final integration of the plant's newest expansion with existing facilities.

February Gas Sales Up 10.4 Per Cent Over 1953 Figure

WASHINGTON.—Natural-gas sales during February amounted to 5,791,528,000 therms, an increase of 10.4 per cent over sales of 5,244,402,000 therms in February 1953, according to the American Gas Association.

For the 12 months ended February 28, 1954, natural-gas sales amounted to 54,482,342,000 therms, an increase of 8.5 per cent over sales of 50,209,234,000 therms in the 12-month period ended February 28, 1953.

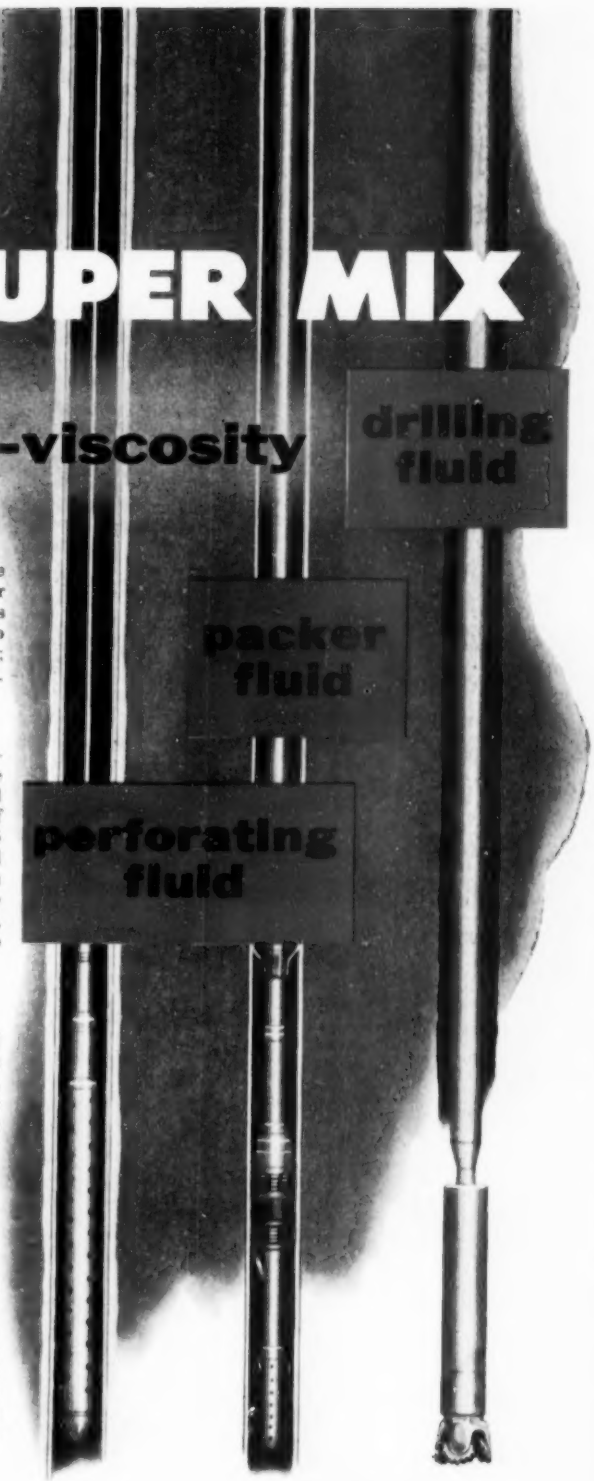
General Gas to Expand L.P.G. Underground Storage

BATON ROUGE, La.—General Gas Corp. plans a 6,000,000-gal. expansion of its liquefied-petroleum-gas underground-storage facilities at Gibsland, La., increasing capacity of the dome to 14,000,000 gal. by early summer.

The company, which currently has a capacity of 8,000,000 gal. in the salt dome, serves 80,000 liquefied petroleum gas consumers in Louisiana and Mississippi.

BLACK MAGIC SUPER MIX

a high-weight, low-viscosity drilling fluid



Here is a new, low-viscosity oil base drilling fluid that can be weighted to extremely high weights, yet remains stable under high temperatures and pressures. Tests have been run for periods of four weeks under high pressures and at temperatures up to 400° F. with no adverse effects. It contains no clays or bentonites; problems of high temperature gelation are completely eliminated.

DRILLING AND COMPLETION FLUID

Due to its low maintenance cost and complete resistance to contamination from cement, salt, anhydrite, etc., Super Mix is the ideal fluid for drilling and completion work where high mud weights are required. During a recent workover job in the Gulf Coast Area, Super Mix was weighted to 17.0 lbs./gal. (127.5 lbs./cu. ft.) with a viscosity of 69 sec. API at 120° F. This mud was in use for six weeks and *the total treating cost was less than $300.00.* Weights as high as 18.7 lbs./gal. (141 lbs./cu. ft.) have been successfully used in the field. For drilling deep, hot holes, heaving shale, and other troublesome formations there is no fluid to equal Black Magic Super Mix.

PACKER FLUID

Super Mix is also being used extensively as a highly weighted fluid in the annulus above production packers in high pressure wells. In no case has the fluid shown any tendency to settle, disintegrate or solidify. When it becomes necessary to pull the packer, the Super Mix—unlike other packer fluids—serves as an ideal drilling or workover fluid. It can not deteriorate by standing idle for long periods of time.

PERFORATING FLUID

As a perforating fluid, Super Mix will not seal off the newly shot holes, as is the case when a fresh or salt water clay mud is used. The excessive heat and force generated by bullets and jet charges actually bakes a hard, solid clay plug behind the shot, thereby minimizing the perforating job. In some cases flow has been restricted as much as 77%.* In recent experiments with perforating guns, Super Mix produced a soft mushy substance in shot holes which dissolved in crude oil when the well came on production. *No possible chance of plugging the formation with this drilling mud.* For more information on Super Mix, write for the paper—"Recent Developments in Oil Base Mud."

*Effectiveness of Gun Perforating, Journ. Pet. Technology, January, 1954.

OIL BASE, Inc.

130 ORIS STREET, COMPTON, CALIFORNIA
Plants in Compton, Houston, Odessa, Duncan

BRANCHES: Bakersfield • Long Beach • Ventura
Houston • Odessa • Oklahoma City • Duncan
Jennings • Harvey • Calgary • Caracas
Lima, Peru • Paris, France • Cable Address: OBI

OB PRODUCTS

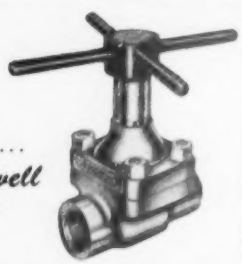
Insurance against wash-outs

The best insurance against wash-outs is a well sealed joint. You can depend on 'Bestolife Lead Seal Tool Joint and Casing Compound to give a perfect seal, without seizing or galling.

The Standard of the Oil Country for over 20 years. Unconditionally guaranteed. Sold at supply houses throughout the world. Packed in 1¼, 5, 20 and 50 lb. containers.

I. H. GRANCELL
1601 EAST NADEAU STREET
LOS ANGELES 1, CALIFORNIA

An ALL-NEW mudline valve



Because . . .
Rockwell Built

MUDWONDER'S

stainless steel stem lasts the life-time of valve and is separate from hard chrome gate, MUDWONDER has a . . .

TWO PIECE PADDLE

Ask your favorite oil field supplier about it today.

Edward Valves, Inc.
Subsidiary of **ROCKWELL MFG. CO.**
1492 W. 145th STREET
EAST CHICAGO (phone 231)
INDIANA

Among the Drilling Contractors

New Contracting Firm Formed at San Angelo

Fortune Drilling Corp. is a newly formed contract-drilling firm operating in the San Angelo area of West Texas. Principal owners are W. J. Green, Howard W. Green, K. V. Northington, and John Nolan, all of whom have been active in oil operations of West and West Central Texas for many years. Headquarters are at San Angelo.

The firm is starting with a newly assembled Bethlehem Twister rig, using an 131-ft. Fox-Diamond mast.

The Greens, who have held numerous oil properties in the area, are former owners of Piedmont Oil Co., incorporated by them in 1953, and recently sold.

Northington, who moved from Abilene, Tex., to San Angelo last November, has been West Texas area geologist for Thomas D. Humphrey, Dallas operator.

Nolan, tool pusher for the new firm, has been associated with Nolan & Hale Testing Co., Abilene, and previously with various oilfield service companies. He also has had many years of experience in rig operation.

Alto Drilling Co. is drilling on a 4,200-ft. contract it has with Sam Cunningham and George H. Coates at a wildcat location southwest of Hebbronville, in Jim Hogg County, Southwest Texas. Location is in the Noriecita Grant at 3 Rita Benavides.

O. K. Smith Drilling Co. is contractor on a rank wildcat test Oceanic Drilling Co., of San Antonio, is putting down 30 miles north of Laredo, in Webb County, Southwest Texas. Location, 1 Connevey, in George Schwartz Survey 97, is 25 miles from nearest production. Contract is for 4,500 ft.

Zach Brooks Drilling Co. has a 6,000-ft. Pettit test drilling for Ashland Oil & Refining Co. on the edge of Cotton Valley field, in Webster Parish, Louisiana. Location is for 1 Leslie Childs unit, in 8-21n-9w.

McKenzie Drilling Co., Corpus Christi, Tex., has a new wildcat operation under way in the William P. Smith Survey, 12 miles northwest of Goliad, in Goliad County, South Texas. McKenzie is both the contractor and a joint operator with Buford Goodwin in the test, listed as 1 Fimble. Hole is projected to 6,200 ft.

Contractors Organize In West Central Texas Area

West Central Texas drilling contractors have completed organization of a regional chapter of the American Association of Oilwell Drilling Contractors.

Officers for 1954 are: chairman, B. F. Gilchrist, Gilchrist Drilling Co.; vice chairman, George M. Straughn, Lauderdale & Straughn; and secretary-treasurer, George D. Hunter, General Geophysical Co., all of Abilene.

Forty-six representatives of drilling firms in the area attended the organizational meeting at Abilene. Also present were: Karl L. Kellogg, K. L. Kellogg & Sons, Compton, Calif., president of the association; Brad Mills, Dallas, executive vice president; and W. L. McClusky, M. J. Delaney Co., Dallas, secretary.

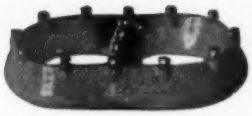
The new chapter is the fifteenth for the association.

Sunnyland Contracting Co., Rayne, La., is drilling on a 6,000-ft. contract it has with J. Paul Ratliff, Jr., of New Orleans, at a wildcat location northwest of Bucatunna, in 25-7n-6w, Wayne County, Mississippi. Objective is the Eutaw formation.

Circle Drilling Co., Lake Charles, La., has another well under way in Bayou Mallet field, Acadia Parish, Coastal Louisiana, where it is drilling for Bates & Cornell. Latest operation, contracted for 8,600 ft., is at 1 Clenny Saviy, in 47-7s-1e.

Dorris Ballew, Inc., Natchez, Miss., is drilling for R. A. Campbell, Vidalia, La., at 3-C Yakey, a Wilcox exploratory test located in 26-4n-8e, 1¼ miles northeast of Bougere, southeastern Concordia Parish, eastern Louisiana. Location is 2½ miles northwest of Roseland. Pay is expected around 7,200 ft.

H. & S. Drilling Co., Tulsa, is contractor on a deep test Union Oil Co. is starting to offset Sunray Oil Corp.'s



High Velocity

FOR EFFICIENT BOILER FIRING

Firemen in the field will tell you that INFERNO Steam Stack Blowers give them maximum efficiency using a minimum of generated steam. Stainless steel nozzle jets, malleable iron bodies, streamlined design. Write for Bulletin 22-A.

THE INFERNO CO.
Box 1138A
115 RICOU St.
SHREVEPORT, LA.
INFERNO

LEAK-PROOF Connections with RECTORSEAL No. 1

• Casing, tubing, drilling rig, field, flow and separator line connections are leak-proof when made up with Rectorseal #1.

It seals against high pressures and temperatures — is impervious to salt water and dilute acids — insoluble in petroleum products — provides proper lubrication for high speed make-up. It never becomes hard or brittle — will not "freeze" the joint.

Rectorseal #1 is economical — easy to use. Available in quart and gallon cans. Ask for it by name at your Supply Store.

RECTORSEAL, DEPT. "D"
2215 Commerce St. Houston 2, Texas

RECTORSEAL
Manufactured by
RECTOR WELL EQUIPMENT CO., INC.
Fort Worth, Texas
MAKING THE OIL INDUSTRY SAFER

Cotton Valley discovery well, completed last June, on the south edge of South Sarepta field, in Bossier Parish, North Louisiana. Union's test, 1 MacIntyre, in 4-21n-11w, is projected to 9,200 ft.

M. B. Armer, Wichita, Kans., is contractor on another wildcat test National Cooperative Refinery Association is drilling in Norton County, northwestern Kansas. Location is for 1 Stone, in 30-4-21w, in the southeastern part of the county.

Brewster-Bartle Drilling Co,. Houston, is scheduled for a 14,000-ft. test to be drilled for Herman Brown, also of Houston, at a wildcat location 4 miles southeast of Turtle Bayou field, in Terrebonne Parish, Louisiana Gulf Coast. Location is for 1 Continental, in 6-18s-15e.

Gordon Drilling Co. is starting another deep, extension test for Union Sulphur & Oil Corp. in the Church Point area, Acadia Parish, Coastal Louisiana. Latest operation is 1 Eulice Clavier, north of the gas-condensate producing field. Hole is projected to 10,600 ft.

W. H. and J. A. Roeder, Bradford, Pa., contractors, are drilling an Oriskany sand exploratory test for Dome Gas & Oil Corp. on Panther Mountain dome, in Ulster County, New York. The test, 1 Amasa Herdman, the first on the structure, is on a 10,000-acre block in Shandaken Township, Phoenicia Quadrangle. Objective is expected around 5,500 ft.

Bodard Drilling Co. is contractor on a Red Fork test Gulf Coast Western Oil Co., of Oklahoma City, is drilling at a wildcat location, 1 Creisel, a mile west of the abandoned East Pawnee field, 2 miles east of Pawnee, in Pawnee County, Oklahoma.

Moran Drilling Co. is drilling Phillips Petroleum Co.'s projected 10,000-ft. wildcat test, 1-C Jackson, 3½ miles southeast of Hoover, in northern Gray County, Texas Panhandle. Location is in Section 208, Block M-2, BS&F Survey.

Enterprise Oil Co., Bakersfield, Calif., has been awarded the contract for the first of at least four additional development wells which Glenn C. Ferguson and I. W. Bosworth have planned for their Miller lease, in Kern Bluff field, northeast of Bakersfield, in Kern County, California.

3 REQUIREMENTS For a GOOD Cement Job

1 **B and W Scratchers**

2 **B and W LATCH-ON CENTRALIZERS**

3 **MOVEMENT OF CASING***

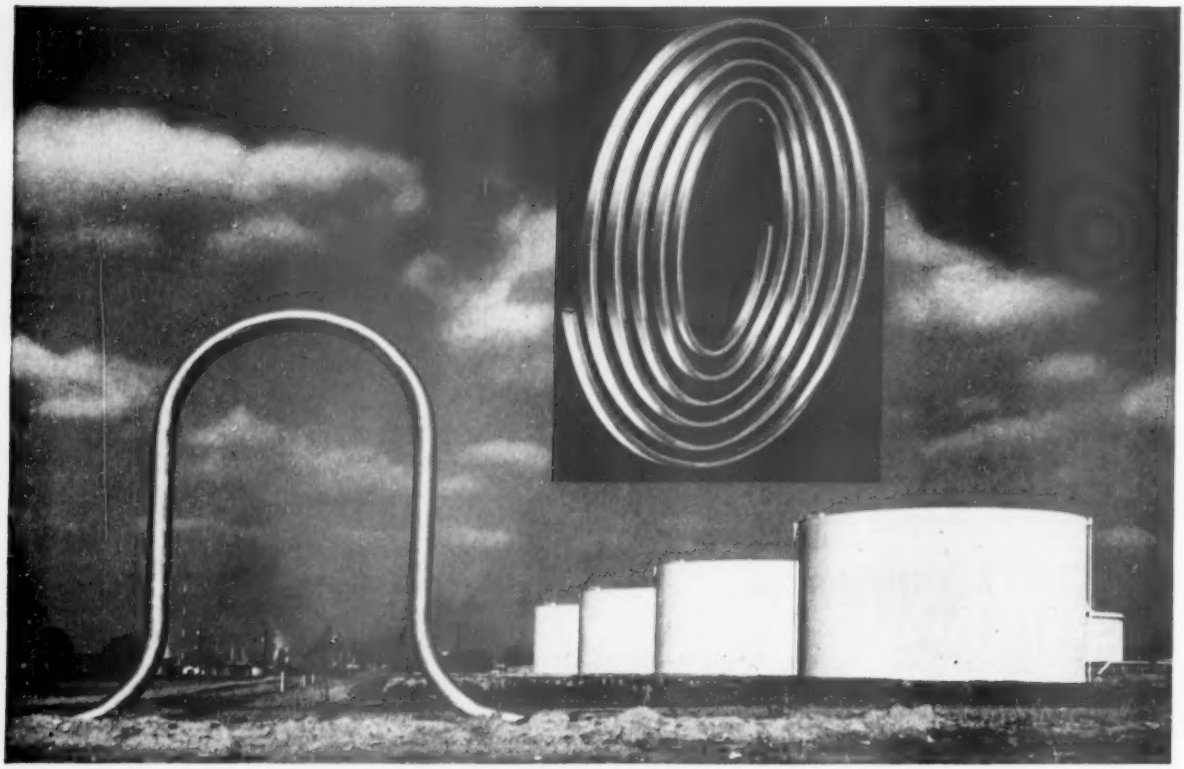
*The highest percentage of successful cement jobs result from . . . mud removal and prevention of channelling by . . . movement of the casing, from the time casing reaches bottom until the plug "bumps."

B and W Inc.
Well Completion Specialists

GULF COAST
P. O. Box 5266
Houston 12, Texas
Phone WE-6603

WEST COAST
3545 Cedar Avenue
Long Beach 7, Calif.
Long Beach 4-8366

DOW



GALVO-LINE CUTS GALVANIC PROTECTION COSTS

Dow's magnesium ribbon anode gives you the most economical pipeline protection

When considering galvanic protection, think first of Galvo-Line®—the most economical method of pipeline protection—unique for its fast, mechanized installation.

While Galvo-Line was designed specifically to cut installation costs, field tests indicate that anode life has not been sacrificed. Properly designed installations in many soils offer as much as 10 years of effective life, and yet retain the other reliability factors expected of galvanic protection by magnesium anodes. There is no risk, for example, of trouble caused by power line failure, rodent attack on insulation, or dried-up ground beds.

Given reasonable conditions, Galvo-Line can be installed at rates upward of 3,000 feet per hour—the equivalent of installing 35 Galvo-Paks® in the same time. Connection-making costs are also reduced—one connection every 500-1000 feet will usually suffice. Uniform distribution and efficient utilization of current contributes greatly to Galvo-Line's economy and dependability in galvanic pipeline protection.

There is every likelihood that Galvo-Line can simplify your pipeline protection job. For the complete story, call your nearest Dow office or distributor of Dow Anodes.

THE DOW CHEMICAL COMPANY, Magnesium Sales Department, Midland, Michigan, MA 315J.

you can depend on DOW MAGNESIUM ANODES

DOW

PIPELINE

Hearings Resumed

Louisiana-to-Michigan gas line proposals to be heard

WASHINGTON.—Hearings on a proposal by American Louisiana Pipe Line Co. to build a natural-gas transmission system from Louisiana to Michigan to supply Great Lakes consumers will get under way this week before the Federal Power Commission.

The hearings include related proposals by Texas Gas Transmission Corp., Michigan-Wisconsin Pipe Line Co., and Michigan Consolidated Gas Co. The hearings began on March 8, were adjourned on March 15 until March 29, and the recess was extended until this week.

The American Louisiana proposal is for a $130,000,000 pipeline construction program, which would include a 1,289-mile, 30-in. transmission line from Lowry, La., in Acadia Parish to a point near Detroit, Mich., which would have an ultimate capacity of 300,000 M.c.f. of gas daily *(The Oil and Gas Journal, January 4, page 120)*.

American Louisiana would get most of its gas from southern Louisiana fields, but Texas Gas plans to supply it with 51,000 M.c.f. daily through a connection near Slaughters, Ky.

To supply the gas, Texas Gas proposes a $4,281,135 project, including 48 miles of loop lines along existing lines and addition of compressor facilities at one of its stations.

Michigan - Wisconsin and Michigan Consolidated both propose expansion of their distribution facilities in order to handle the adidtional gas which would be received from American Louisiana. Michigan Consolidated also proposes development of an underground storage field.

Cities Service Lets Contract For Crude-Line Extension

BARTLESVILLE, Okla. — Contract for construction of a 60-mile, 12-in. extension from Sour Lake, Tex., to Houston, of Cities Service Pipe Line Co.'s 20-in. crude system from Sour Lake to Lake Charles, La., has been awarded to O. R. Burden Construction Corp. of Tulsa.

Work on the extension will begin immediately, with completion scheduled for the middle of June. It will enable Cities Service's affiliate, Texas-New Mexico Pipe Line Co., and other pipeline firms to transport their crude to Sour Lake for transportation to Lake Charles.

Initial capacity of the Houston to Sour Lake line will be 48,000 bbl. daily, with an ultimate capacity of 70,000 bbl. Work already has begun on the tank farm at Fauna, Tex., near Houston where six 120,000-bbl. floating-roof tanks are being erected *(The Oil and Gas Journal, January 11, page 144)*.

Argument Slated

Pacific Northwest gas service fight nears end

WASHINGTON. — The question of which company will eventually get a permit to deliver natural gas to the Pacific Northwest will come up before the Federal Power Commission again here June 1.

Oral arguments have been scheduled on that date in the consolidated proceedings involving seven different proposals.

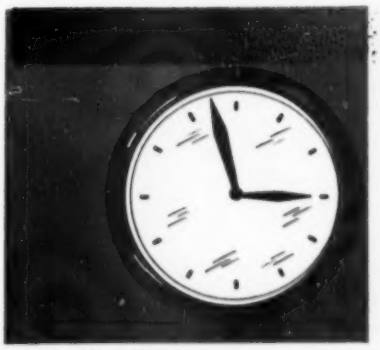
Applicants are Pacific Northwest Pipeline Corp., Westcoast Transmission Co., Inc., Northwest Natural Gas Co., Glacier Gas Co., Trans-Northwest Gas, Inc., Northern Natural Gas Co., and Colorado Interstate Gas Co.

The FPC has ordered the intermediate decision procedure omitted at the request of Pacific Northwest and Westcoast Transmission. The action means that the case will be decided directly by the commission without the filing of an intermediate decision by a hearing examiner.

Nearly 200 days of hearings have been held since they were begun on June 16, 1952, and more than 28,000 pages of testimony and 600 exhibits have been presented. The FPC said an intermediate decision is not possible since the first examiner to preside over the hearings became ill and a second examiner presided over the latter part of the hearings.

Brief deadlines . . . April 26 has been set by the FPC as the deadline for the filing of main briefs by the contesting applicants. Briefs by the staff counsel and all other parties are to be filed by May 11, and reply briefs by the applicants may be filed by May 26.

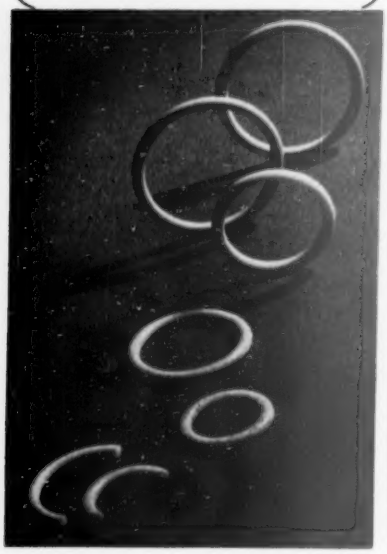
Pacific Northwest proposes to build a pipeline system from the southwestern



TIME SAVING SERVICE

TEFLON "O" RINGS

molded by DORE' for OIL INDUSTRY APPLICATIONS



● Inert to all commodities, TEFLON "O" Rings are unaffected by acid, alkalies, hydrocarbons or sour crudes.

Molded by Dore', TEFLON "O" Rings are available in a wide range of sizes; are made to A-N specifications and tolerances. They have a low coefficient of friction - safe working temperatures from −90° F. to 350° F.

Dore' has developed a means for expanding "O" Rings for their installation in all standard "O" ring grooves—has research facilities for developing filled TEFLON "O" Rings for special applications.

Write us your "O" Ring applications — and we'll furnish TEFLON "O" Rings to meet them.

John L. Dore', Co.

SALES AGENTS IN U.S.A. FOR JOHN L. DORE', INC.
MOLDERS OF "TEFLON" AND "KEL-F" SHAPES
P. O. BOX 7772 • HOUSTON 7, TEXAS

United States to the Pacific Northwest, with some gas to be delivered to Colorado Interstate.

The other applications involve the proposed importation of natural gas from Canada into the Pacific Northwest, or in the case of Northern Natural, into the Midwest.

Colorado Interstate Gets Approval for New Facilities

WASHINGTON.—Pipeline facilities which will enable Colorado Interstate Gas Co. to deliver additional natural gas to Natural Gas Pipeline Co. of America have been approved by the Federal Power Commission.

The new facilities, estimated to cost $3,999,703 *(The Oil and Gas Journal, February 15, page 212)*, will include about 50 miles of 20-in. line from Greenwood field in Morton County, Kansas, to a connection with Natural near Hooker, Okla.; a dehydration plant in Morton County; and a delivery meter station.

Natural Gas Pipeline will build facilities near Hooker at a cost of about $665,000 to receive the additional gas from Colorado Interstate. Colorado Interstate proposes to deliver 20,000 M.c.f. of gas daily on a firm basis to Natural Gas Pipeline from Greenwood field, and Natural Gas Pipeline will have first call until January 1, 1956, on any excess available gas up to an additional 30,000 M.c.f. daily.

The new line will have a capacity of 60,000 M.c.f. daily. At present Colorado Interstate is delivering about 134,000 M.c.f. of gas daily to Natural Gas Pipeline.

Contractors Resume Work on Yellowstone Products Line

SPOKANE, Wash.—Two main-line contractors have resumed construction work on Yellowstone Pipe Line Co.'s 540-mile products system from Billings, Mont., to Spokane.

Engineers Limited Pipe Line Co., with field office at Coeur d'Alene, Idaho, resumed operations in the middle of March. Associated Pipe Line Contractors, Inc., based at Bozeman, Mont., started work again April 1.

Both had suspended operations during the winter. Eastern Pipeline Contractors, with field office at Hot Springs, Mont., has had a spread in the field throughout the winter.

Work on the Yellowstone system started last fall, and 202 miles of 10-in. and 6 miles of 8-in. have been laid since then. By Christmas a total of 145 miles of line had been laid.

. . Conquest

Men, methods and machines function as well ordered team for efficient construction of pipe lines.

HOUSTON CONTRACTING CO. LTD.
General Contractors
OIL • GAS • GASOLINE • WATER PIPE LINES
2707 FERNDALE • HOUSTON 6, TEXAS
GENERAL PARTNERS
LAURENCE H. FAVROT • R. P. GREGORY
ASSOCIATE
GEORGE A. PETERKIN

SAFE! FAST! PERMANENT!

Adams Pipe Line Repair Plugs

REPAIR LEAKS IN LARGE DIAMETER PIPE LINES, TANKS AND BOILERS

Manufactured by
Adams
PIPE REPAIR PRODUCTS
2453 Merced Ave.
El Monte, Calif.
Write for FREE Literature

A pump station at Billings is being built by Lowe Construction Co., and a station and terminal at Helena, Mont., are being built by Whitehurst Construction Co.

Fulton Gets Contract for 132-Mile Great Lakes Line

KANSAS CITY.—Great Lakes Pipe Line Co. has awarded contracts to R. H. Fulton & Co., Lubbock, Tex., for construction of a 132-mile, 8-in. products line. The line will connect Great Lakes' Nebraska City, Neb., pump station with the site of a proposed terminal at Doniphan, Neb., midway between Hastings and Grand Island.

Fulton is expected to begin work late in April.

Great Lakes officials said bids soon will be asked for construction of the terminal facilities at Doniphan and an electric powered pump station near Lincoln, Neb.

Kansas-Nebraska Proposes Gas-Line Replacement

WASHINGTON.—Kansas-Nebraska Natural Gas Co.'s plans to replace 41 miles of gas lines, build a new compressor station, and add cooler and scrubber facilities at existing stations will be heard by the Federal Power Commission April 19.

Cost of the over-all project is estimated at $922,410. The hearing also will include Kansas-Nebraska proposals to abandon certain facilities and modify earlier certificate orders authorizing additional gas service.

Hearings Slated on Merger Of Tennessee Gas Subsidiary

WASHINGTON.—Plans of Tennessee Gas Transmission Co. to acquire by merger all facilities of Northeastern Gas Transmission Co., a wholly owned subsidiary, will be heard by the Federal Power Commission April 12.

Northeastern owns a main transmission line between the Springfield, Mass., and Greenwich, Conn., areas, and a system extending from the Pittsfield, Mass., area and the northeastern corner of Massachusetts.

The FPC denied the companies' request that the proposal be heard under the shortened procedure for noncontested proceedings, saying it had received protests and petitions to intervene from customers of both.

Pipe Delivered for Final Section of Ohio Fuel Loop

COLUMBUS, Ohio.—Ohio Fuel Gas Co. has received delivery of pipe for construction of 14 miles of 20-in. line as the final section of a 65-mile loop from Sugar Grove near Lancaster to Howell Junction near Dayton.

The entire project will cost an estimated $500,000. A 25-mile section of the loop was completed in 1952, and a 26-mile segment was completed last year from Sugar Grove toward Mount Sterling, crossing the Scioto River. The 14-mile section will run from Mount Sterling directly east.

RATIGAN
SWIVEL LINK
150,000 Lb. Capacity

Ratigan No. 89 spring type Swivel Link is used as a tubing hook as well as a swivel weight to pull down the rod lines. It weighs 435 lbs. and has a normal length of 44".

The end links on the No. 89 can be easily opened or closed instantly by means of quick acting safety pins.

SOLD THROUGH LEADING SUPPLY STORES

J. P. RATIGAN, Inc.
1213 Santa Fe Ave., Los Angeles 21
Export: National Supply Co., Inc., Export Div.
600 Fifth Ave., New York 20, N.Y.

MEN AND EQUIPMENT FOR YOUR NEXT PIPELINE JOB

SINCE 1926

S-4

EXCEL-SO CALIBRATING TANKS

Send for Bulletin CT-102-53

For use in accurately calibrating positive displacement meters at refineries, terminals, pipe lines, loading racks, tank trucks and public sealers.

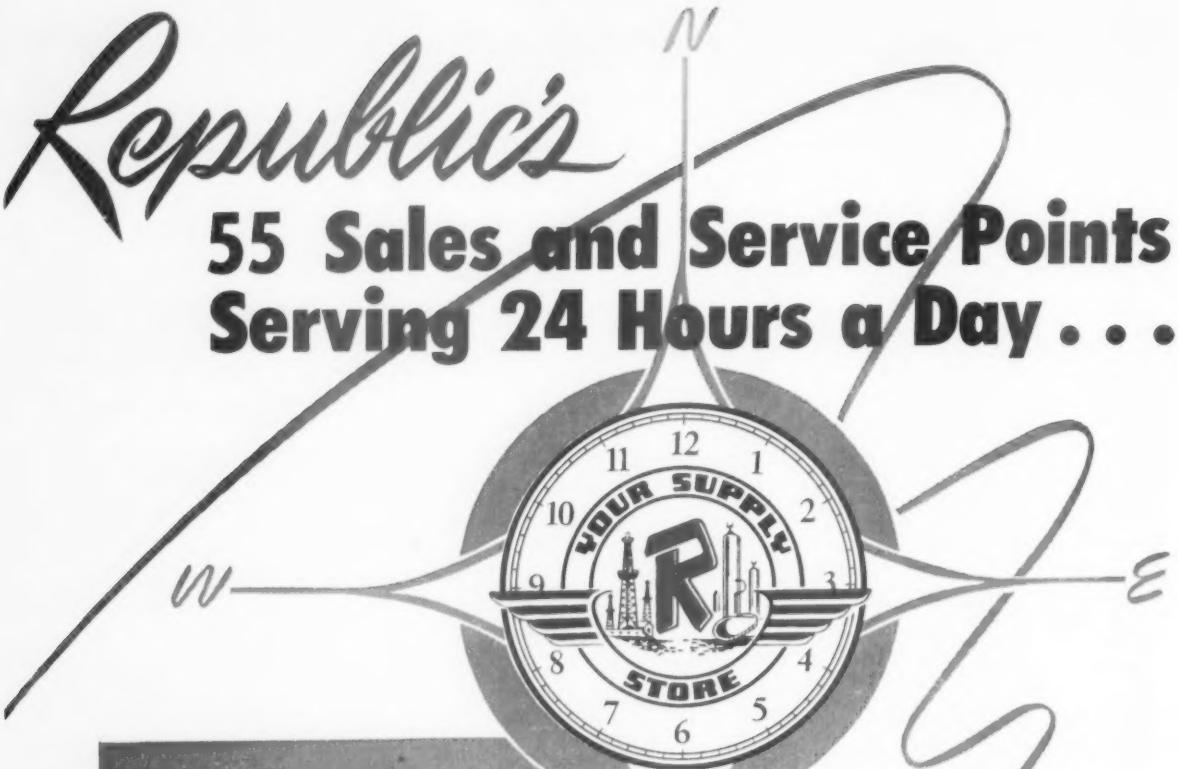
A calibrating tank, or meter prover, is essential in keeping your meters accurate. Small meter errors can be very costly. Here is a precision instrument which will quickly pay for itself. Designed to conform with the A.P.I. Code #1101 Excel-So Calibrating Tanks come in sizes from 50 gallons to 2000 gallons in both stationary and portable styles.

WARNER LEWIS COMPANY
BOX 3096 • TULSA OKLAHOMA

Division of FRAM CORPORATION

Republic's

55 Sales and Service Points Serving 24 Hours a Day . . .



LOUISIANA:
Shreveport
Bodcau
Haynesville
New Iberia
Lake Charles
Harvey
Houma

ARKANSAS:
El Dorado

TEXAS:
Kilgore
Corpus Christi
San Antonio (Sales Office)
McAllen
Victoria
Alice
Houston
Wichita Falls
Electra
Pampa
Abilene

TEXAS: (Contd.)
Borger
Morse
Olney
San Angelo
Rule
Whitesboro
Dallas (Sales Office)
Fort Worth (Sales Office)
Odessa
Lubbock (Sales Office)
Midland (Sales Office)
Big Spring
Seminole
Kermit
Snyder

NEW MEXICO:
Hobbs
Farmington

WYOMING:
Casper

OKLAHOMA:
Tulsa (Sales Office)
Bartlesville
Seminole
Oklahoma City
Cement
Elmore City

KANSAS:
Great Bend (Sales Office)
Wichita (Sales Office)
Arkansas City
Russell
Ellinwood

ILLINOIS:
Salem
Grayville
Fairfield
Chicago (Sales Office)

COLORADO:
Denver (Sales Office)
Fort Morgan

The convenient, combined services of 44 completely stocked field "warehouses," and 11 centrally located sales offices, are at your disposal every hour of every day, and at every point of the compass!

The modern, REPUBLIC SUPPLY STORES, always alert to your requirements, have maintained an enviable record of forty-three years of dependable service . . . your guarantee of immediate, proper delivery, and your assurance of getting what you need, when and where you need it!

Republic Supply
COMPANY

EXPLORATION

Instrument X . . . Myth or Miracle?

by Frank J. Gardner

"TROUBLE with you oil fellers is, ya gotta run like hell to stay where y'are!"

That bit of earthy observation, coming from one of the better-paid royalty owners in West Texas, compressed a lot of thought into one small truth pill for the exploration man.

We've been running, and we've been staying just about where we are, according to the figures on new oil discovered and that produced during the last 5 years. At the moment, we are a wee bit ahead on the treadmill, but if we slow down even to a trot, the pincers of shortage are going to start pinching at our barrel bottoms.

Over these last 5 years, new liquid reserves discovered in the United States (including revisions and extensions) have averaged 1.4 billion barrels per year more than withdrawals, but withdrawals themselves have averaged 2.3 billion barrels per year.

So we are running mighty close to the margin on discovery of new oil. At the same time, exploration activities have never reached such a high pitch. More wells are being drilled, more new areas are being explored, more new methods of search are being employed than at any other time in oil history. The earth is being thumped, gouged, dynamited, analyzed, and shot through with radio waves in an unprecedented effort to make it give up oil. Geologists and geophysicists are flying through the air and diving beneath the sea in the ceaseless search for areas of promise. They are performing jobs that were never learned in school, and experimenting with methods that were beyond the wildest imagination 10 years ago.

What does all of this mean? And where is it going to end?

It means that oil is getting harder to find. It means that exploration expense has soared, and we're having to spend more money to find the oil. It means that a drilling prospect must show greater promise of production before an oil man will drill it.

Through it all runs a weird undertone—there is a strange feeling of expectation throughout the industry that we may be on an important exploration threshold. For years, oil men have awaited the miracle tool that will show them where to drill. The fact that we have jeered at the divining rod, the wiggle stick, and the doodlebug doesn't mean that we haven't been fascinated by them; no honest man can say he hasn't wished for such a magic instrument.

And much of science originated in sorcery—it may be this very realization that has led us never to discount entirely the possibility that some day, somewhere, someone is going to startle the world with a miracle oil finder.

Many strange new exploration methods are already in use, nearly all of them in the "direct oil-finding" category: radioactivity halos, flying scintillometers, radiation counters, "geobiology," and numerous other revolutionary weapons, most of them based on magnetics and radioactivity.

The effectiveness of these new tools can only be proved by tangible results; will they be able to show and prove that they were directly responsible for oil in the tanks? If so, the impact upon the exploration field could be profound; if not, we can rest assured that still other methods will be tried and new tools designed to continue the search for "Instrument X."

Meanwhile, the indirect approaches to oil finding will continue to be improved upon in an effort to winnow the field of prospective oil areas to those of greatest promise for production. The contributions of geology and geophysics to oil discovery have been enormous, and the two sciences will always form the solid basis for interpretation and refinement of whatever results may come from Instrument X.

All these factors contribute to the earnest atmosphere that will surround the current national convention of geologists and geophysicists in St. Louis. These men know that they've "gotta run" if we are to stay where we are. Nearly 5,000 of them are conducting joint and simultaneous conferences in an effort to analyze the problems of oil finding today, and to suggest possible solutions to some of those problems.

The program for this convention reflects the ever-increasing influence of the electronics and nuclear research fields upon earth science and its objectives. It is definitely a looking-ahead program and one that points up the gradual change that is occurring in the oil-search techniques of our time.

It is entirely within the realm of possibility that such a miracle tool will appear; as the cost of oil exploration continues to spiral, the urgency for new, more direct and cheaper means of oil detection is magnified. Huge sums are going into the budgets of major oil companies for research; no possibility is being ignored, and the best brains in the country are at work sifting for clues, groping for the answer to the puzzle of pool disclosure.

It is probable that significant developments in this field are imminent, and that they will possess considerable potential for future oil discovery; most of the major research firms are not inclined to reveal results just yet, but when they do, we may see myth turned into miracle.

At this meeting, the oil finders will learn that 6,925 wildcat holes were drilled in the United States during 1953. They will learn that 774 of these were successful. That's a success ratio of 11.2 per cent, about the same as in 1952. They will be told that today, we must drill about 60 per cent more wildcats than in 1947 in order to discover 16 per cent more oil; that the average footage drilled increases steadily year after year in every hole that's sunk.

These facts cannot but impress upon every delegate to that convention that the future course of oil exploration in this country is going to be more demanding upon the individual oil hunter year after year, if our reserves are to keep pace with our consumption of petroleum. Earth scientists cannot relax in their efforts while waiting for the mysterious Instrument X to appear and snatch him from a possible dilemma.

In short, he will be told that he's "gotta run like hell" to stay where he is.

Cambrian Holds Bright Promise In West Texas

Reserves of over 1 million barrels per well are forecast for this new pay zone, discovered in 1953. Six producing areas were discovered in past 10 months to prove trend for 50 miles.

by Norman S. Morrisey

RECENT prolific production from sandstones of Cambrian age indicate that the new pay zone has been proved for 50 miles along the eastern edge of Coke and Nolan counties, Texas. Initial potentials of 1,870 bbl. per day from 200 ft. of saturated sand have been reported. Ultimate recoveries of at least 1 million barrels per well on 40-acre spacing are forecast for this zone. *(See The Oil and Gas Journal, March 15, 1954, page 195).*

Cambrian sand production is anticipated along this trend in eastern Fisher County and may eventually extend into South-Central Stonewall County. To the south, production from Cambrian pay may develop in Tom Green and possibly Schleicher counties. Eight wildcats are currently drilling on the trend seeking production from this rich horizon.

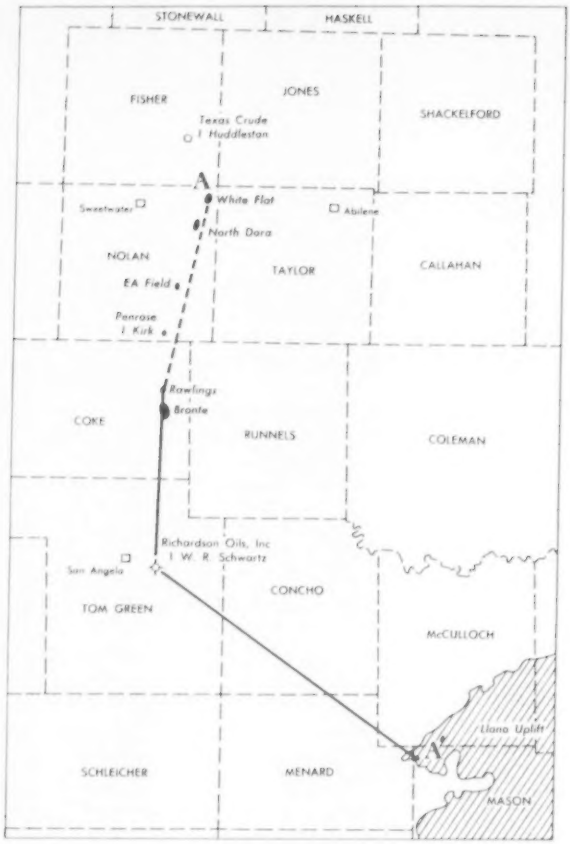


Fig. 1—Cambrian production is found at six fields in Coke and Nolan counties. Producing zones are probably present in the Llano uplift, 100 miles to the southeast.

Stratigraphy

Only a few wells have penetrated the entire Cambrian section in Nolan, Coke, and Tom Green counties. Nearest Cambrian outcrops to the new discoveries are found on the northwest edge of the Llano uplift, 100 miles southeast of the producing fields.

Geologists consider that the formations of the outcrop sections are present in the subsurface and are attempting to correlate the surface and subsurface stratigraphy. As a consequence, the nomenclature set forth by Bridge, Cloud, and Barnes,[1 2 7] is used. The outcrop formations of the Llano uplift are described in descending order as encountered in wells (Figs. 2 and 3).

	West Texas and Llano Uplift		Oklahoma		Rocky Mountains
CAMBRIAN	WILBERNS FORMATION	San Saba limestone	ARBUCKLE GROUP	Butterly dolomite	Gallatin limestone
				Signal Mountain limestone	
		Point Peak shale		Royer dolomite	
				Fort Sill limestone	
		Morgan Creek limestone	HONEY CREEK LIMESTONE		Gros Ventre shale
		Welge sandstone			
	RILEY FORMATION	Lion Mountain sandstone			Flathead sandstone
		Cap Mountain limestone			
		Hickory sandstone	REAGAN SANDSTONE		

Fig. 2—Regional stratigraphic chart of the Cambrian formations.

The Ellenburger group . . . The Ellenburger group varies in thickness from 0 to 970 ft. in the northwestern part of the uplift. This limestone sequence is considered Ordovician in age. Except where it has been stripped off by erosion, the Ellenburger overlies the Cambrian strata.

It is difficult to differentiate the Ellenburger from the underlying Wilberns formation because of the similar lithology. The San Saba member of the Wilberns has been included in the Ellenburger group by early workers. Detailed stratigraphic work can separate these beds, however.

The following summary will aid in distinguishing the Wilberns from the Ellenburger:

Wilberns (San Saba)

Fine to very-fine-grained or microgranular, brownish-gray dolomites and/or granular and slightly glauconitic limestones. Small subspherical stromatolites are locally abundant.

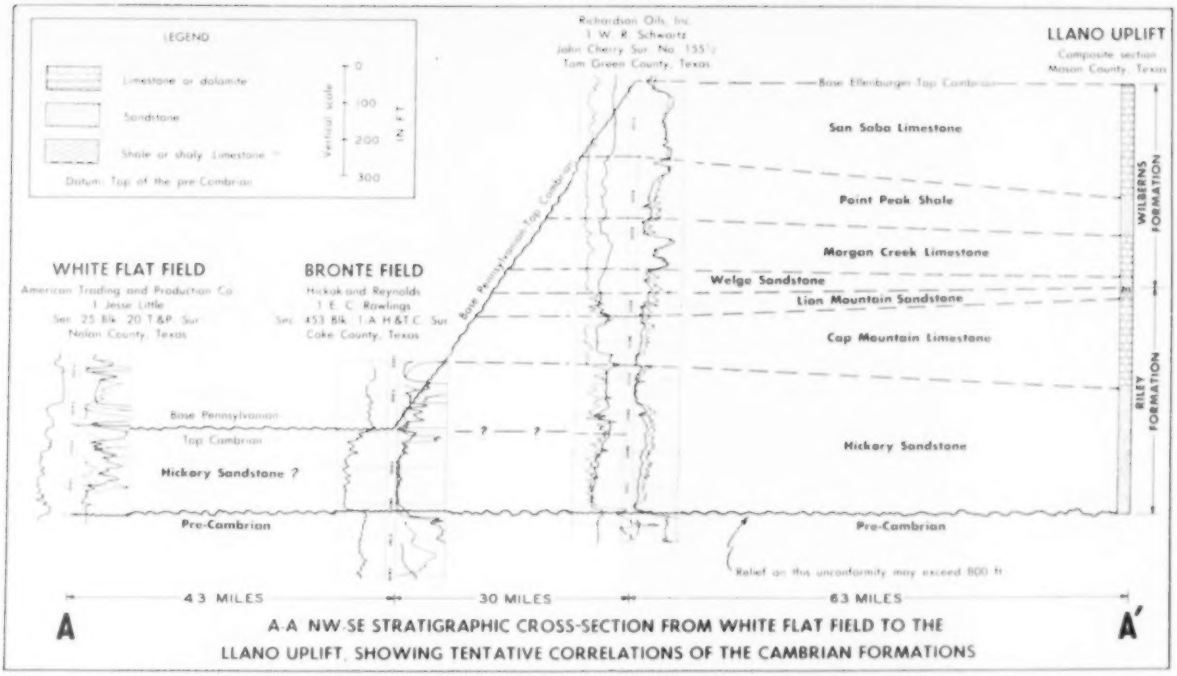


Fig. 3—The effect of Pennsylvanian erosion in Coke and Nolan counties is shown. The Cambrian sandstone at White Flat and Bronte has the same stratigraphic position as the Hickory in the Llano uplift.

Ellenburger (Tanyard)

Coarse to medium-grained dolomites and sublithographic, nonglauconitic limestones.

The Wilberns formation . . . The Wilberns formation is divided into four members (Fig. 3). In the Llano uplift the Wilberns ranges in thickness from 540 to 620 ft.; it is Upper Cambrian in age.

The San Saba member has an average thickness of 270 ft. and consists of microgranular dolomites and granular and slightly glauconitic limestones. Normally the dolomite overlies the limestone, but these carbonates grade into each other horizontally and vertically. **Locally the dolomitic facies is over 250 ft. thick.**

The Wilberns production may be coming from the dolomitic part of the San Saba member.

Below the San Saba in descending order are the Point Peak shale, the Morgan Creek limestone, and the Welge sandstone members.

The Point Peak shale is about 130 ft. thick and consists of green calcareous shales interbedded with minor amounts of limestone, limestone conglomerate, and dolomite. It grades into the overlying and underlying limestone members of the Wilberns. Locally the Point Peak contains bioherm reefs up to 50 ft. thick.

The Morgan Creek limestone, about 130 ft. thick, consists of granular glauconitic limestones. At its base it is sandy and may grade into the Welge sandstone below.

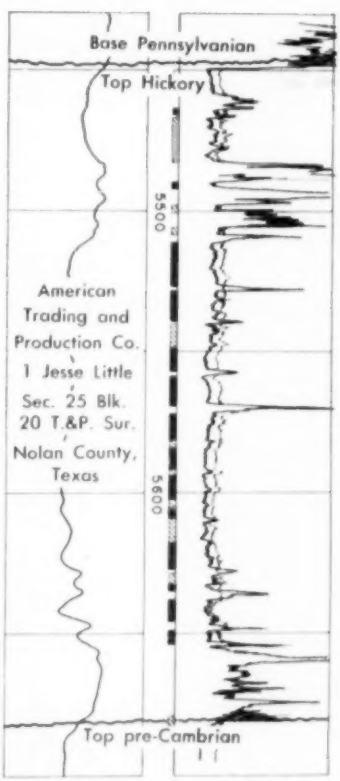


Fig. 4—MicroLog of the Cambrian discovery well in White Flat field shows 140 ft. of pay.

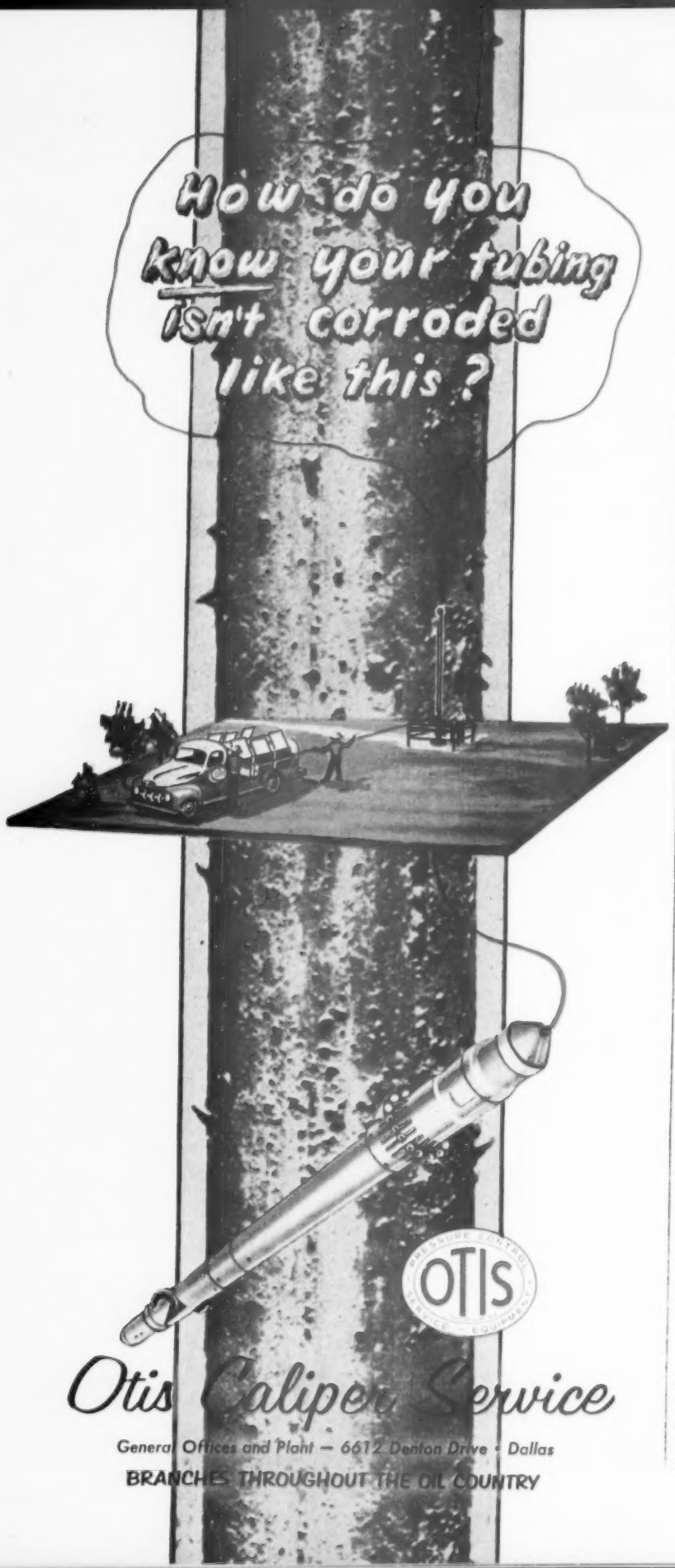
The Welge sandstone member is about 20 ft. thick and consists of yellowish-brown, sparingly glauconitic to nonglauconitic sandstone. On the outcrop the Welge is present over a wide area and may be a potential reservoir in the subsurface.

The Riley formation . . . The Riley formation includes all Cambrian strata below the Wilberns in Central Texas and has an average thickness of 700 ft. It is divided into three members from top to bottom: the Lion Mountain sandstone, the Cap Mountain limestone, and the Hickory sandstone. The age of the Riley is Upper Cambrian; the basal member, the Hickory sandstone, occupies the same stratigraphic position as the Reagan of Oklahoma.

The Lion Mountain sandstone member is about 50 ft. thick and consists of glauconitic and calcareous sandstones.

The Cap Mountain varies in thickness from 0 to 497 ft. It consists of calcareous sandstones and glauconitic, gray to brown, granular limestones.

The Hickory sandstone is a noncalcareous, nonglauconitic sandstone; its thickness is variable, ranging from 0 to 470 ft. on the outcrop. **On the outcrop, the Hickory rests upon an old pre-Cambrian surface that has a relief of**


How do you know your tubing isn't corroded like this?
OTIS
Otis Caliper Service
General Offices and Plant — 6612 Denton Drive • Dallas
BRANCHES THROUGHOUT THE OIL COUNTRY

at least 800 ft. Locally the pre-Cambrian hills extend into the overlying Cap Mountain and the Hickory is absent through nondeposition.

Subsurface Correlations

Correlations between the outcrop section and the subsurface in Coke and Nolan counties are complicated by the unconformity that separates the Pennsylvanian and pre-Pennsylvanian beds (Fig. 3). The Cambrian sand at White Flat field is probably equivalent to the Hickory sand.

The dolomite production in the Wilberns may correspond to the San Saba dolomite found on the outcrop. Detailed work is needed, however, to identify properly the members of the Wilberns and Riley formations. It is unlikely that a major unconformity separates the Ellenburger group from the Wilberns formation. As a consequence, beds previously identified as Ellenburger in the subsurface may be equivalent to the Wilberns formation. Insoluble residue studies should prove invaluable in identifying the pre-Pennsylvanian limestones and dolomites.

Formations widespread . . . The Cambrian formations of West Texas are regional in extent except where, locally, they have been stripped off by erosion.

At least three potential reservoirs can be expected: the Wilberns dolomite, the Welge sandstone, and the Hickory sandstone. In local areas, parts of the Wilberns or the Riley may produce because of secondary dolomitization, especially at the unconformity.

Current drilling activities . . . Eight wildcats are drilling along this trend in Coke, Fisher, and Nolan counties seeking these rich new pay zones.

The Texas Crude Co. et al. 1 Huddleston in southeastern Fisher County cored 16 ft. of saturated limestone that has been identified as either Wilberns or Ellenburger. A drill-stem test of this interval (5,834-46 ft.) recovered 660 ft. of oil with no water; operator is drilling ahead.

In addition to the trend tests, there are eight active wildcats in Coke, Nolan, and Fisher counties. Needless to say, these wells will test the Cambrian.

The Cambrian of Texas deserves close attention.

Acknowledgement

Much of the information pertaining to the producing fields was obtained from the San Angelo Geological Society Guidebook, "Cambrian Field Trip —Llano Area." Data on White Flat fields were kindly furnished by Ameri-

can Trading & Production Corp. and its geologist, Arthur W. Neff.

References

1. Bridge, Josiah, Barnes, V. E., and Cloud, P. E., Jr., "Stratigraphy of the Upper Cambrian, Llano Uplift, Texas," Bull. Geol. Soc. Amer., vol. 58, pp. 109-124, pls. 1-8, 1947.
2. Cloud, P. E., Jr., and Barnes, V. E., "The Ellenburger Group of Central Texas," Univ. Tex. Pub. 4621, 1946.
3. Crowley, A. J., and Hendricks, Leo, "Lower Ordovician and Upper Cambrian Subsurface Subdivisions in North Central Texas," Bull. Amer. Assoc. Petr. Geol., vol. 29, pp. 413-425, pls. 1-10, 1945.
4. Ellinwood, H. L., "Late Upper Cambrian and Lower Ordovician Faunas of the Wilberns Formation in Central Texas," Ph.D. thesis, Univ. Minnesota, 1953.
5. Howell, B. F. (and others), "Correlation of the Cambrian Formations of North America (Chart No. 1)," Bull. Geol. Soc. Amer., vol. 55, No. 8, pp. 993-1003, 1 pl. correl. chart, 1944.
6. Palmer, A. R., "Faunas of the Riley Formation in Central Texas," Ph.D. thesis, Univ. Minnesota, 1950.
7. San Angelo Geological Society, "Cambrian Field Trip—Llano Area, 1954."
8. Walker, T. R., "The Petrology of the Upper Cambrian Sandstones of Central Texas," Ph.D. thesis, Univ. Wisconsin, 1952.

OKLAHOMA

Production Tests Due at Hughes Wildcat

Production tests in the Booch and Hartshorne sands will be run at Ray P. Diehl 1 McCoin, indicated discovery well in SE SE NW 31-7n-9e, 3 miles south of Holdenville in the highly active Hughes County area.

Hall & Troup-Moore 1 Buchner, NE SW NE 17-7n-9e, in the area of the connection of East Holdenville and Grief Creek pools, will be fractured in the lower Booch.

Purdy Trend Extended To The West One Mile

Max Pray 1 Eason, SW SW SW 26-3n-4w, Garvin County, is a new Hart sand well 1 mile west of the Purdy trend producing area.

No commercial oil was found in the Springer sand, penetrated to 10,635 ft. The well flowed 10 bbl. of load oil per hour and then distillate at the rate of 4 bbl. hourly through small choke with 2,000 M.c.f. of gas from Hart sand perforations at 8,852-70 ft.

Stephens Pool Grows

Stephens County's Prairiedale pool, opened recently at An-Son 1 Baker, NE NW NW 35-1n-5w, has a northeast extension completed, and six wells are active in the area.

Samedan Oil Corp. 1 Burkhart, NE SW NE 27-1n-5w, pumped 103 bbl. of oil per day from lower Hoxbar sand perforations to become the northeast 1-mile extension. The 1 Myrtle Burkhart, NE NW NE 34, is completing. The well flowed 38 bbl. of oil per hour through 22/64-in. choke. The 2 Burkhart, NW NW NW NE 34, and the 1 Ford, SW NE SE 27, are both under way.

In the NE SE NE 34 T. T. Eason 1 Drake flowed 25 bbl. of oil in 2 hours from perforations on tests, and the 1 McLendon, NW NE SW 35, is drilling below 4,760 ft. An-Son Petroleum Co. 1 Keltner, SW SE SW 35, the northeast offset to the discovery well, is due fracture treatment.

The discovery well of the pool, An-Son 1 Baker, pumped 146 bbl. of oil per day from perforations at 5,229-74 ft., 31°-gravity oil.

KANSAS

Stafford Wildcat Flows Oil From Viola Lime

Greenland Drilling Co. and National Cooperative Refinery Association have a flowing Viola discovery 1½ miles east of Macksville in Stafford County.

The 1 Isern, NE NE NE 14-24s-15w, 3 miles northeast of Farmington pool, nearest production, flowed gas in 11 minutes and oil into pits after 1 hour on drill-stem test in the Viola lime at 4,089-4,159 ft. The operators are running 5-in. casing.

Barber Gas Strike

GMR Oil Co. and Lion Oil Co. have a new gas pool or extension well at 1 Lenkner, SW NE SW 24-33s-14w, 1½ miles west of Medicine Lodge pool in central Barber County.

The well gaged 3,020 M.c.f. of gas per day on drill-stem test at 4,775-4,800 ft.

Flowing Pratt Strike

Lario Oil & Gas Co. have a new pool in Pratt County at 1 Shriver, NW SW SE 12-29s-14w, 2 miles north of Coats pool.

The discovery well gaged 3,120 M.c.f. of gas in 7 minutes and flowed oil in 15 minutes on drill-stem test in the Lansing lime at 4,307-41 ft.

New Pools Named

The Kansas Nomenclature Committee of the Mid-Continent Oil and Gas Association, meeting recently in Wichita, named ten new oil and gas pools in nine Kansas counties.

Southern Kansas . . . North Hittle pool was opened by Aladdin Petroleum Co. at 1 Sommers, SW SW NW 15-31s-4e, Cowley County. The Bartlesville sand discovery well is completing. Beardmore Drilling Co. 1 Berg, SW SW SE 29-32s-7w, Harper County, was completed for 134 bbl. of oil per day on the pump from the Viola lime to open Berg pool. Frank Purcell et al 1 Dickson, NE NE NW 8-31s-8w, Harper County, opened Northeast Grabs pool in the Mississippian.

Central Kansas uplift . . . D. R. Lauck Oil Co. opened Southeast Erbert pool in Ellis County at 1 Raynesford, C N½ NE SE 28-12s-20w. Production is from the conglomerate. On the northwest end of the uplift in Norton County Berry & Fick 1 Baird, NE NW SW 13-5s-21w, opened North Ray pool with Arbuckle production. On the southwest side of the uplift in Pawnee County GMR Oil Co. 1 Dufford, SE SE SE 6-21s-15w opened West Sweeney pool for 5,000 M.c.f. of gas and 108 bbl. of oil per day from the Arbuckle.

On the west side of the uplift in Pratt County North Chance pool was opened by A. G. Hill 1 Dodson, SW SE NW 21-26s-13w, finaled for 168 bbl. of oil per day on the pump from the Simpson. Southeast Crawford pool was opened in Rice County by Derby Oil Co. 1 Wolf "A," NE NE NW 20-18s-6w. The discovery is completing in the conglomerate. Widener pool in Stafford County was opened by Friedman & Autry at 1 Widener, SE SE NE 26-21s-12w. Production is from the Arbuckle.

In southwestern Kansas' Ford County South Pleasant Valley pool was opened by City Products at 1 Vice, SW SW NE 14-28s-21w, for 7,600 M.c.f. of gas per day from the Mississippi.

Pawnee Stepout

Mississippian production has been re-established by Welch & Olsson at 1 Clar, SE SE NW 8-23s-17w, stepout ½ mile north of the former limits of Garfield pool in Pawnee County. The extension discovery recovered oil from the Mississippian, Misener, and Viola in drill-stem tests.

CANADA

New Pembina Strike

Oil success has been indicated at another exploratory driller in the Pembina region, some 70 miles west-southwest of Edmonton, following the running of initial drill-stem test in the Stanolind-Hudson's Bay team's E-1 Pembina-Crown venture.

This well, a 4¾-mile south step-out from the group's most southerly oil well, gave up an encouraging recovery of oil-cut mud in the Cardium, was deepened below that drill-stem test and crew was running electrologs at weekend.

The well, Stanolind-Hudson's Bay E-1 Pembina-Crown, LSD 12, 6-48-9w5, is 4¾ miles south-southeast of the Stanolind D-1 Hudson's Bay Cardium oil strike, 5¼ miles southwest of the team's A-1 driller and 7½ miles southwest of the Socony-Seaboard 30-10 Pembina oil well.

Crew entered the Cardium at 5,588 ft., or 2,642 ft. subsea (K.B. elevation 2,946 ft.), and drill-stem tested from 5,579 to 5,620 ft. for 75 minutes. Natural gas flowed in 12 minutes, at rate too small to measure and recovery was 300 ft. of oil-cut mud. Hole was taken down to 5,660 ft., and log is being run.

Saskatchewan . . . The Frobisher area Mission Canyon oil discovery well in southeast Saskatchewan, drilled by Canadian Gulf Oil Co. on farmout lands from Canadian Devonian Petroleums, Ltd., has flowed oil at rates of 168, 102, and 86 bbl. daily on tests, through various sized chokes. The oil is about 40° gravity, and on later tests, water cut is between 1 and 2 per cent.

This well, Canadian Gulf-Canadian Devonian 9 Quinn, LSD 9-34-4w2, is 12½ miles north of the North Dakota border, 47 miles west of the Manitoba line and 23 miles east of Estevan. It is understood that the casing, which was run to 4,655 ft., was not perforated, and that the production is coming from a crevice in the cement plug near bottom hole. It is not yet known whether or not the well will be squeeze-cemented and then perforated, or whether it will be produced in its present state.

The first reported test, was run for 5 hours, through a 12/64-in. choke, yielding a rate of 86 bbl. daily. There was no formation water reported, and gas-oil ratio is believed to be favorable. One of the later tests, 5 hours in duration, gave up 35 bbl. of oil through a 12/64-in. choke, for rate of 168 bbl. daily. The other, for 8½ hours, through a 10/64-in. choke, produced 36 bbl. for a rate of 102 bbl. daily. It was on these tests that the water-cut of 1 to 2 per cent was indicated.

EASTERN CANADA

Ontario . . . In Ontario County, a water well drilling on the E. P. Taylor National Stud Farm 2 miles north of Oshawa encountered a small gas show, accompanied by mud and water, at 140 ft. depth. The gas, burning with a 4-ft. flame, was later choked off with mud, but tests will likely be made as to its commercial value. It is the first gas discovery in Ontario County.

Gaspe . . . In the Gaspe Peninsula, Quebec Province, the 1 asphalt base on the Galt Brook dome, drilling up lost bailer, has completed a fishing job and is resuming from 2,055 ft.

ROCKY MOUNTAIN

MONTANA

Richland County Wildcat Continues Tests

Sun Oil Co. and Eramont Petroleums, Ltd., have continued to recover apparently commercial quantities of oil on tests of Madison in the North Sidney area of Richland County. Latest swab recovery from the wildcat, 1 Beagle Land & Livestock was 90 bbl. of oil, 24 bbl. of basic sediment and 6 bbl. of water. Test was of the zone 9,002-62 ft., the only Madison zone tested to date. The interval has been acidized several times. An earlier 12-hour test swabbed 37½ bbl. of oil and 3½ bbl. of oil. Gages in 12 hours have run as high as 140 bbl. of oil.

The operators have reported the formation relatively hard with little natural porosity and permeability. Other eastern Montana wells which have had Madison shows have failed to produce. There is no production from the formation in Montana east of the Cedar Creek anticline.

SOUTH DAKOTA

Buffalo Area Offset Has Slight Show

Shell Oil Co. has reported recovery of oil and gas-cut muddy water on test of Red River at 32-16 SW NE 16-21n-4e, Buffalo area, Harding County. The well is an offset to the company's recently completed discovery which is the first producer in the state.

Test of the zone 8,668-85 ft. recovered 155 ft. of oil and gas-cut mud, 240 ft. of heavily oil and gas muddy water and 35 ft. of slightly oil and gas-cut muddy water. Shell is continuing to test.

WYOMING

Two Uinta County Wildcats Report Shows

Stove Creek Oil Co. has reported shows of oil in a wildcat in the Stove Creek area of Uinta County. Casing was landed at 5,586 ft. at 3 Government, NE SE NE 27-14n-119w and the operation is swabbing perforations at 5,366-84 ft. Sample top of Bear River was found at 5,312 ft. No details of recoveries on swab test have been reported, although tests are continuing. Shows of oil have also been unofficially reported in Aspen at about 4,945-50 ft.

Another wildcat, 11 miles northwest of the Stove Creek well Wasatch Petroleum of Wyoming is drilling below 4,620 ft. at 1 Government, NE NE SE 26-16n-121w, in the Bear River area. A good show of oil was reported in the Evanston (Tertiary) sand. The well will test Bear River. It is on acreage farmed out by Sun Oil Co.

Deep Carbon County Wildcat Suspended

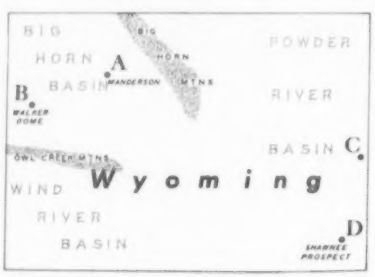
Ohio Oil Co. has suspended operations at 1 Unit, NW NE SW 22-22n-85w, in the South Cedar Ridge area of Carbon County. The well flowed oil and gas on test of the zone 10,119-10,137 ft. The zone was called a stray sand by the operator. Total depth of the well, which was spudded in June of 1953 was 13,177 ft. It was originally scheduled as a 9,500 ft. Sundance test. Ohio reported the well as temporarily suspended.

Big Horn Basin Discovery Confirmed

Ohio Oil Co. swabbed at the rate of 176 bbl. of oil per day at 2 Smith, NW SW NW 9-46n-99w, in the Walker Dome area of Hot Springs County. The well is a confirmation of the Phosphoria discovery in this area by Forest Oil Corp. The discovery was drilled in 1953. Production is from the zone 6,690-6,700 ft. This pool is immediately north of depleted gas production at Walker Dome.

Converse County Newcastle Test Dry

T. W. Eggleston has abandoned 1 Government, NE NE SW 5-40n-67w, in the Wagonhammer area, Converse County. The well is 3 miles south and west of the most westerly production in the Newcastle sand trend south from Weston County. Total depth was 8,575 ft. and Newcastle was logged at 8,454-69 ft., with no sand development. The well is the first to test to Newcastle in the northeastern portion of Converse County.



L. J. Peterson is preparing to plug back and complete in the Phosphoria at 1 Fox-Government, Manderson area extension in Big Horn County (A on map). The well is 1 mile south of the 2 Wycol-Government, a Tensleep discovery completed for 97 bbl. of oil per day. Ohio Oil Co. reported swab recovery of 176 bbl. of oil per day at 2 Smith, Walker Dome area extension in Hot Springs County (B on map). The well is an extension to Forest Oil Co. 1 Mill Iron Land & Cattle Co. The wells are just north of depleted gas production from Frontier at Walker Dome and existing gas production at Little Grass Creek. Northern Drilling & Producing Co. has staked a confirmation to its 1 Government in the Sherwin area of Weston County (C on map), completed last year for 152 bbl. of oil per day. Carter Oil Co. is drilling below 13,744 ft. at their Shawnee prospect in Converse County (D on map). Thrust faulting has reportedly been found, and formations previously drilled are being repeated.

COLORADO

South Adena Discovery Flows

Sunbeam Oil Co. reported a flow of oil at the rate of 75 bbl. per hour through ½-in. choke on test of 1 State, NE NE SW 35-1n-58w, Morgan County. The well is 2 miles south of Adena field production. Production is from "J" sand in the zone 5,897-5,902 ft. Tests are continuing at the discovery. Meanwhile this operator has made tentative location for several additional wells in the area.

First Black Hollow Permian Failure Reported

The California Co. has abandoned 4 UPRR, C NE SW 1-7n-67w, southwest of production in Black Hollow field, Weld County. The failure is the first in the field. Production has been found in Lyons sand in previous drilling at Black Hollow. At 4 UPRR the operator drilled to a depth of 10,001 ft., about 1,000 ft. below previous production. Lyons top was tentatively called at 9,055 ft. The well was thoroughly cored below this depth with no shows reported. Salt water was recovered on tests.

UTAH

Bluff Bench Lists Running Logs

Carter Oil Co. is running logs at Bluff Bench Unit, C NW SW 29-39s-22e, San Juan County. Total depth is 7,811 ft. The wildcat will be abandoned when logging is completed. Top of Mississippian was called at 7,310 ft., and test 7,571-7,614 ft. recovered salt water with some carbon dioxide cut mud. The wildcat is west of Three States Natural Gas Co.'s wildcat on the Bluff unit, 1 State, C SE SW 32-39s-23e. The latter well showed for production, but continued testing had decreasing recoveries of oil. It is now shut in.

ARIZONA

Apache County Test Suspended

Shell Oil Co. has suspended tests at 1 Navajo in the northeastern corner of Apache County. The well, in C SE SE 6-41n-29w, flowed gas at rates varying from 100 to 1,000 m.c.f.p.d. on tests of Hermosa. Some small amounts of oil were also recovered, but fluid recovery had a very high percentage of water.

Meanwhile, Shell has made location for a 7,300-ft. test to Cambrian about 19 miles north of the suspended wildcat in San Juan County, Utah. The new well is 1 Desert Creek, SW SE NW 2-42s-23e. It is within the Navajo Indian Reservation where Shell was a heavy bidder at lease sales in 1953.

MISSISSIPPI

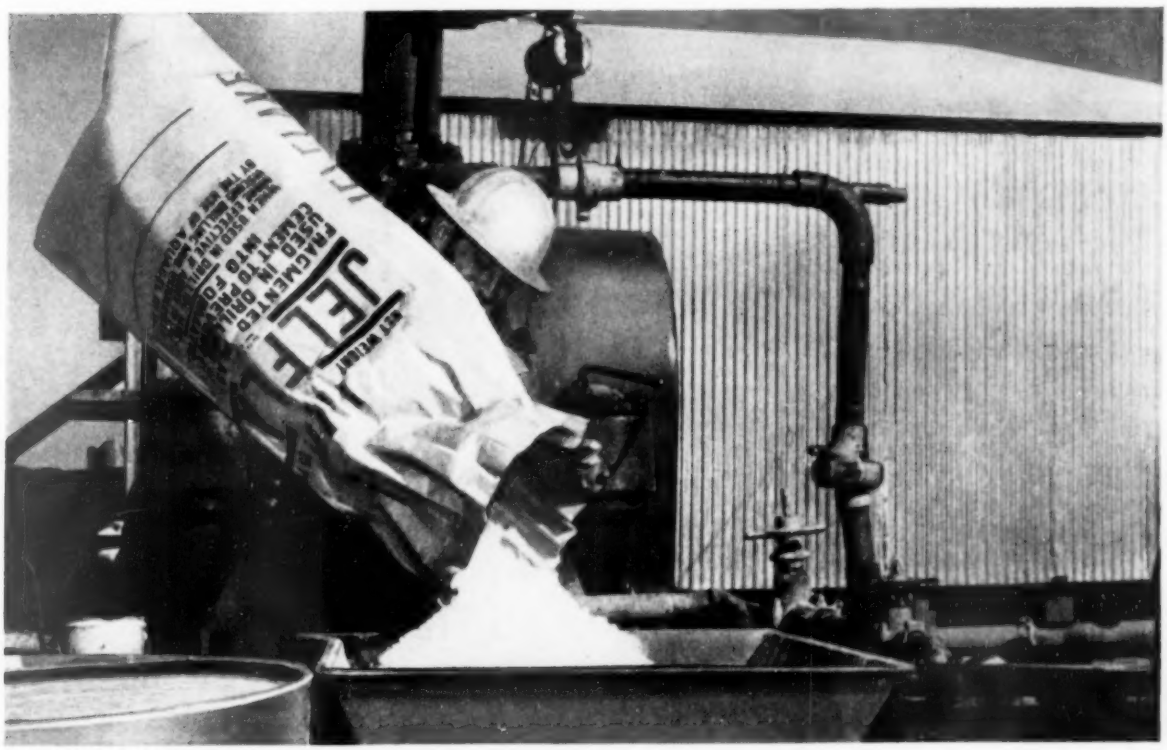
New Warrior Basin Field First in Calhoun County

Indications of another Black Warrior basin field have been given by promising gas and condensate showings encountered in Honolulu Oil Corp.'s rank wildcat test, 1 Davis, northeast of Reid, in eastern Calhoun County, northeastern Mississippi.

Showings were in the Abernethy zone of the Chester series, in which two drill-stem

JELFLAKE STOPPED MUD LOSS WHERE COTTONSEED HULLS FAILED

Feather-light, graded plastic particles sealed off thief zone in minutes with plugging and plastering action



Over 21 tons of mud was lost at 6,440 feet in a drilling well. Twenty tons of cottonseed hulls were pumped into the well without restoring circulation. Then 300 pounds of Jelflake®—fragmented plastic foil—was added to a new pit of mud. Circulation was restored as soon as the *Jelflake*-laden mud reached the porous zone.

Results like this illustrate how Jelflake can be used to cut costs on drilling and cementing jobs.

Jelflake particles are graded to work two ways: First, the smaller sized flakes penetrate into formation pores to plug them. Second, the larger pieces are designed to plug and plaster themselves over the formation face and form an impervious filter cake, capable of withstanding high pressures.

The flakes have a crinkled surface which helps them to disperse readily into mud without balling. They are thin and pliant—and penetrate irregular-shaped openings readily. The contents of one 25-pound bag can cover over a half-million square inches of formation surface.

Jelflake requires no special apparatus for application. It's easy to add to your drilling mud through a hopper or it can be added at the mud hog suction.

A handy supply of Jelflake is your best insurance against lost circulation. Jelflake is packed in 25-pound, wet-proof bags for easy handling. For further details, see your nearest mud distributor or Dowell station. Or, write to Dowell Incorporated, Tulsa 1, Oklahoma, Dept. D-11.

DOWELL SERVICE

Acidizing • Fracturing • Electric Pilot • Perfojet
Paraffin Solvents • Bulk Inhibited Acid • Jelflake®
Corban® • Chemical Cleaning for Heat Exchange Equipment

DOWELL INCORPORATED • TULSA 1, OKLAHOMA
A Subsidiary of The Dow Chemical Company

"First in Oilfield Acidizing . . . Since 1932"

Look to **DOWELL**

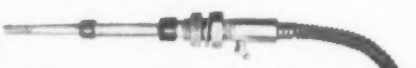
FOR OIL INDUSTRY CHEMICAL SERVICE

WHICH OF THESE CHARACTERISTICS ARE ESSENTIALS ON YOUR REMOTE CONTROL JOBS?

Accuracy . . . High Load Capacity . . . Adaptability . . . Freedom from Trouble . . . Long Life . . . Flexibility . . . these are some of the qualities of **ACCO TRU-LAY PUSH-PULL FLEXIBLE CONTROLS** that have made it possible to improve the operation of literally hundreds of mechanical products (list on request). Full description of this versatile REMOTE CONTROL is given in our **DATA FILE** available for your further study.

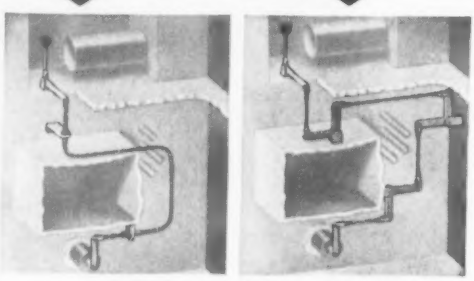
ACCURACY is inherent in the basic design, and in the standards of quality and precise dimension that control the manufacture of TRU-LAY PUSH-PULL CONTROLS. These are precision products, not gadgets.

VERSATILITY of this fine remote control can best be illustrated by citing some of the jobs it handles well . . . **HOT** jobs on jets and industrial furnaces . . . **COLD** jobs down to —70° F. . . . **WET** jobs (the conduit can be completely immersed) . . . **DIRTY** jobs . . . **ABRASIVE** jobs . . . **CORROSIVE** jobs . . . **HEAVY, TOUGH** jobs up to 1,000 lbs input . . . **LIGHT DUTY** jobs . . . **REMOTE** jobs 150 feet or more from the control point . . . these units are frequently and successfully used in conjunction with electric, hydraulic and air controls . . . are thoroughly effective under almost any operating condition.



"SOLID as a rod but FLEXIBLE as a wire rope" aptly describes TRU-LAY PUSH-PULL CONTROLS. This *flexibility* provides positive, remote action whether anchorages are fixed or movable . . . it damps out noise and vibration—protects delicate instruments . . . it permits ease of handling and shipping even when assemblies are 100 or 150 feet long . . . it avoids the risk of damage always present with solid tubular controls that must be preformed to position . . . and flexibility greatly simplifies installation of controls by reducing the number of working parts and by making it possible to snake around obstructions. . .

to give you this simple and effective assembly ⬇ **. . . rather than this complex (and expensive) series of linkages** ⬇



ADAPTABILITY to all sorts of mechanical situations explains, in large measure, the wide-spread application of TRU-LAY PUSH-PULLS. Standard anchorages, fittings and heads have been designed that meet requirements on approximately 80% of the installations. Simple modifications of these standards, or minor changes in your own design, cover almost every special situation. Our engineers have the know-how on such matters.

FREEDOM FROM TROUBLE and **LONG LIFE** are assured even under exceptionally adverse operating conditions because of such things as . . . full protection of the flexible, inner, working member by the tough flexible conduit . . . lubrication of the inner, working member *for life* during assembly . . . seals that keep moisture, dust and other foreign matter out of the unit . . . cold swaging of fittings that makes them integral parts of the control unit. (Full construction details in our **DATA FILE**). We have never heard of a TRU-LAY FLEXIBLE PUSH-PULL CONTROL wearing out in normal service.

Whether your interest is in a single application of this versatile PUSH-PULL CONTROL, or in its inclusion as a component of the product you manufacture, the six booklets and bulletins in this **DATA FILE** will answer your further questions, and will also provide you with the means of defining to us the application you may be interested in.

DATA FILE

ACCO ***WRITE for a copy, without obligation***

AUTOMOTIVE and AIRCRAFT DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

601-D Stephenson Bldg., Detroit 2
2216-D South Garfield Ave., Los Angeles 22 • Bridgeport 2, Conn.

tests were made, both getting gas flows and recovering gas and condensate-cut mud. In the first test, at 3,274-90 ft. and using ⅞-in. bottom and ¼-in. top chokes, gas flow was estimated at the rate of 1,400,000 cu. ft. per day. Recovery was 70 ft. of gas and condensate-cut mud.

The second test, made with hole deepened to 3,325 ft. and taking in the interval below 3,290 ft., flow rate was not estimated but recovery was 40 ft. of gas and condensate-cut mud.

Casing already has been run for the completion attempt.

The prospective discovery is first in the county and the first so far this year in the basin. Location is nearly 20 miles west of the nearest field, located to the east in adjoining Chickasaw County.

TEXAS

WEST TEXAS

Crockett County Wildcat Flows Oil on DST

Bankline Oil Co. and Hurt Oil Co. 1-41 Forrestall, 1 mile southeast of the southern tip of Tippett field, in western Crockett County, has made two heavy oil flows on drill-stem test. The conglomerate pay section has been tentatively identified as Permo-Pennsylvanian, topped at 6,006 ft. Wolfcamp pay in Tippett field is around 6,230 ft.

First test was made between 6,158-6,222 ft. Oil flowed in 17 minutes, was cleaned into pits, then filled storage tanks at any estimated 80 bbl. an hour. Operators drilled ahead to 6,244 ft., then tested between 6,223-44 ft. Oil reached the top in 44 minutes and filled a 40-bbl. tank in 10 minutes. Final test, from 6,242-70 ft., established the water table. Gas reached the surface in 25 minutes but recovery was 5,400 ft. of salt water. Electrical surveys were being run for completion.

Another Crockett discovery prospect is Pure Oil Co. 35 Vaughn, 1 mile northwest of shallow San Andres production in Bean pool. A drill-stem test in Ellenburger limestone at 7,588-7,619 ft. recovered 6,270 ft. of oil. Operators were coring ahead. Nearest Ellenburger production is in Todd deep and Elkhorn pools.

Crane County prospect . . . Texas Pacific Coal & Oil Co. 1-A Adams, 12 miles north of Crane, developed 2,550 ft. of free oil on a 4-hour drill-stem test in the Wolfcamp at 7,890-8,015 ft.

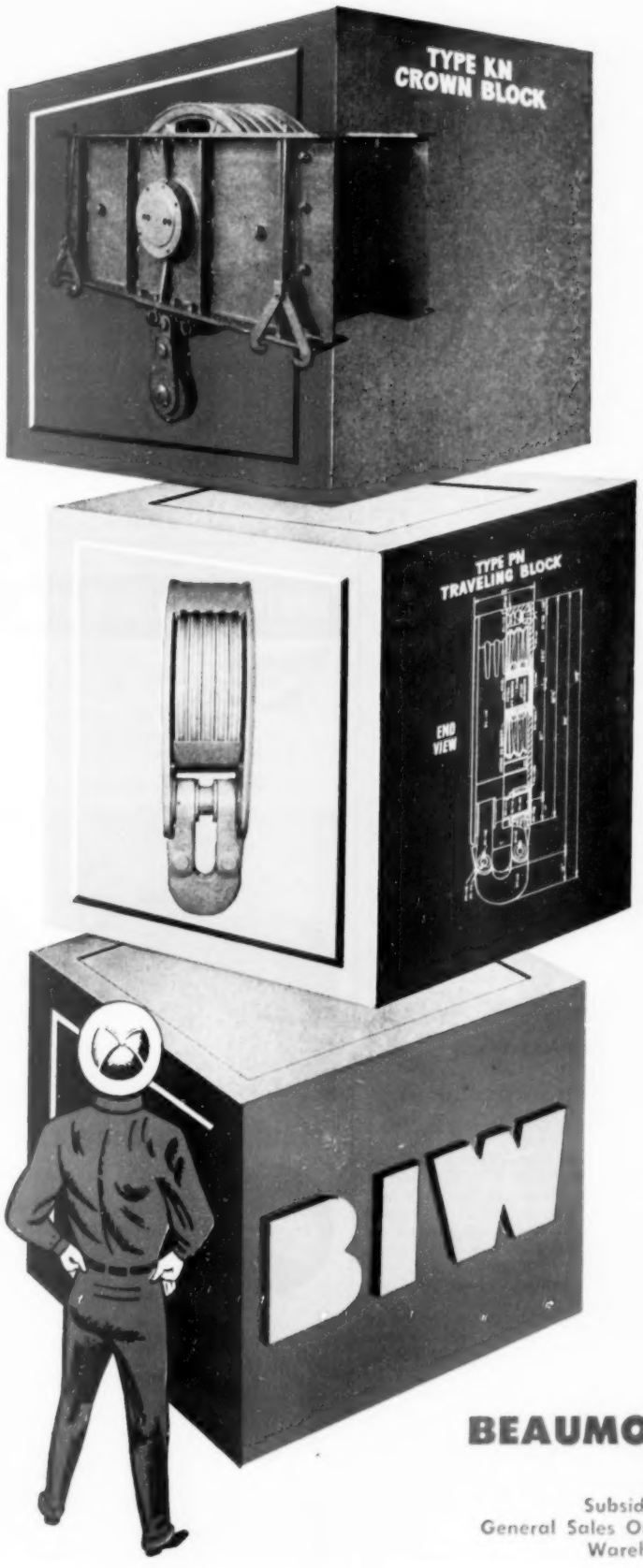
Sutton discovery completed . . . Bluebonnet Oil & Gas Co. 1 Walker estate, Canyon lime discovery 13 miles northeast of Sonora, Sutton County, rated a calculated daily flowing potential of 120 bbl. of oil a day. The flow was through ¼-in. choke from pay between 2,946-64 ft.

TEXAS GULF COAST

Second Well Completed In South Clinton Area

New Vicksburg production has been opened in the South Clinton area, east of Houston, in Harris County, where Reynolds Mining Corp. has completed its 1 Mamie Furr flowing 128.28 bbl. of 36.1°-gravity oil daily through ⅞-in. choke with 400-psi. pressure.

The well, the second for the area, is 1,660 ft. northwest of the discovery producer, drilled by Production Service Co. Pay zone



BIW BLOCKS

BUILD GREATER DRILLING EFFICIENCY!

New, two way bearings on the Type KN Crown Block and the Type PN Traveling Block handle both radial and thrust loads as pure right angle loads. This design increases bearing capacity, reduces weight, and cuts space requirements. Longer bearing life results plus reduced maintenance and replacement costs.

The Crown Block can be hoisted through the water table in one piece. Because the center pin is on the center line of the beam, either flange of the beam can be set on the water table beams. The narrow width of the 300 ton capacity Traveling Block permits maximum pipe racking for deep drilling. With its low center of gravity, kicking or side lift is kept to a minimum. Bearings and sheaves are interchangeable between Crown and Traveling blocks.

Write for the complete story on what these blocks can do to cut your drilling costs, increase your drilling efficiency. Beaumont Iron Works, one of the oldest oil country manufacturers, builds a complete line of drilling and producing equipment.

BEAUMONT IRON WORKS CO.

Beaumont, Texas

Subsidiary of American Locomotive Co.
General Sales Office: 1404 Dunlavy St., Houston 19, Texas
Warehouses in Beaumont and Odessa

SAFETY
WHEEL WRENCH
by Baird

Will fit rods from ½" to 1¼". The jaws are hardened.

For safety reasons, be sure to use hub bolt for sanded up jobs.

Always available through your supply store.

BAIRD MFG. CO.
P. O. Box 380 TULSA, OKLA.

INFERNO
Gauge Cocks

- Are Low Priced
- Have Double Lives
- Will Not Leak
- Have Renewable Nozzle Tips

INFERNO Gauge Cocks tested in our laboratory have remained firmly seated until subjected to more than 3000 lbs. hydraulic pressure. Write for FREE copy of Bulletin 18-C.

THE INFERNO CO.
Box 1138A
115 RICOU-St.
SHREVEPORT, LA.

is productive from a perforated interval at 6,470-75 ft. The new well is 775 ft. southwest of a dry hole drilled by the discovery company.

New Jefferson Area Gets First Confirmation Well

Stanolind Oil & Gas Co.'s recent Hackberry oil-discovery 2 miles northeast of Hampshire, and a mile northeast of Fannett field, in Jefferson County, has been confirmed by Clegg & Hunt and associates with completion of their 1 Frost, second producer in the new area.

The confirmation well, producing from sand intervals at 11,370-78 ft. and 11,386-92 ft., flowed 27.57 bbl. of 30.1°-gravity oil per day through 6/64-in. choke. Pressure gaged 3,800 psi. Gas-oil ratio was 8,380 cu. ft.

Stanolind's discovery well, 1-B Marrs McLean, flowed 78.84 bbl. of net oil per day from sand interval at 11,369-75 ft.

New Aldine Oil Discovery

A new oil-producing area, located 1¼ miles northeast of East Aldine field, northern Harris County, has been opened with the completion by Union Producing Co. at its 1 Bender, pumping 30.37 bbl. of net oil daily from Yegua sand at 7,072½-73½ ft. Gravity of the oil is 38.1°. Water cut measured 80 per cent of the total fluid. Pay is the same as in East Aldine field, discovered in 1953, and in which two wells have been completed.

South Meyersville Well Completed in Two Zones

Continental Oil Co. has a new dual-zone gas-condensate well in the South Meyersville area, southeast of Meyersville, DeWitt County, where it has completed its Ruschaupt in both the first and second Massive Wilcox sands.

From the upper zone, perforated at 8,212-50 ft., the well flowed 85 bbl. of condensate with 3,341,000 cu. ft. of gas per day through adjustable choke. Production from the lower zone, perforated at 8,368-80 ft., was gaged at 52 bbl. of condensate with 2,572,000 cu. ft. of gas per day.

Total depth is 8,512 ft.

SOUTHWEST TEXAS

East Hoffman Extensioner Opens New Producing Zone

A 3,700-ft. extension and another pay zone are virtually assured East Hoffman field, 8 miles southeast of Freer, in Duval County, by results of a drill-stem test in an outpost well drilled by Bridwell-Gorman-Yoakum.

Approximately 220 ft. of clean oil was recovered in the test, open 30 minutes through ¼-in. and ⅜-in. chokes. Interval tested was at 2,029-46 ft.

The well, 1 Greene, in BS&F Survey 66, northeast of production, has been deepened to 2,070 ft., where oil-string is being run for completion.

New Discovery Completed In Western San Patricio

S. H. Howell has a new oil-discovery well about 3½ miles southeast of Edroy, in western San Patricio County, near the Nueces County line. Completed in sand interval at 6,115½-17 ft., the well, 1 Bluntzer, flowed at the rate

FREIGHT COSTS GOT YOU

hopp -ing?

for lowest shipping cost
for prompt, expert handling
for complete common carrier service New Orleans West

Route DIXIE on the Canal

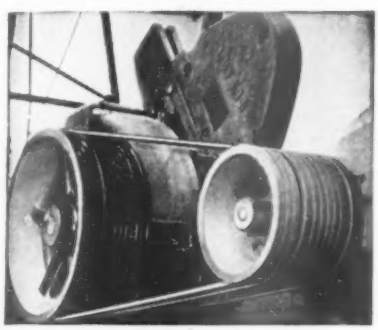
connecting with all River carriers. Dixie one-carrier bulk service — over entire Mississippi-Ohio river system
Call or Write

DIXIE CARRIERS INC.

THE DC MODERN FLEET

HOUSTON
203 Fidelity Bank Bldg.
CH-3543

NEW ORLEANS
1422 Nat'l Bank Commerce
MA-6631



ideal for drilling rigs

Wood's

oil, heat, water resistant v-belts

If your V-Belts are affected by static, oil, heat, or water we suggest you consult us. We won't offer any "cure-all" belts for these conditions, but we will offer belts designed and constructed to resist oil, heat, etc. to a varying degree. You'll get much longer belt life and have fewer expensive belt replacements. So before you order that next set of belts, consult us.

T. B. WOOD'S SONS COMPANY
1117 W. COMMERCE ST., DALLAS, TEXAS

of 148 bbl. of 41°-gravity oil per day through 8/64-in. choke under pressure of 850 psi.

The discovery is approximately 4,000-ft. north of the one-well Meehan field, opened by Jake L. Hamon, which produces from a 5,330-ft. sand. A fault separates the two areas. The new area has been designated tentatively as Mary Bluntzer field. Location is in San Patricio de Hibernia Grant.

CALIFORNIA

New Coalinga Pool Being Expanded

Two extension tests were getting under way at the new pool Union Oil Co. discovered earlier this year on the north edge of Guijarral Hills, Fresno County. Union 4 Bell was being started in SW NW 26-20s-16e, about ½ mile northwest of the Leda sand pool discovered by 1 Spieler at 8,811-72 ft. West of the discovery one location 6 Wittemore was being rigged up.

Midway between the discovery and a ¼ mile southwest extension Union was in process of completing 8 Spieler. Almost ½ mile northwest, in NE SE Section 27, Standard Oil Co. of California was completing 85 27F. This well on a 1½-hour formation test at 8,605-52 ft. surfaced oil in 1 hour and during the remaining ½ hour flowed 37°-gravity crude at a 1,500 bbl. daily rate. Standard had prepared 87 27F one location south for its next test.

Continental Tests D-8 Zone at San Miguelito

Continental Oil Co.'s first test of the D-8 zone in the portion of the San Miguelito field where D-5, D-6, and D-7 production have been established, found the deeper pay wet. On a 13-hour flow test at 13,652-14,219 ft. its 702 Grubb produced 500 bbl. of fluid, cut 90 per cent with water. Hole then was plugged back from total depth of 15,002 ft. to 13,600 ft. where it was to be completed in the D-7 at 12,560-13,120 ft.

The well is about 1¾ mile west of Shell Oil Co. 378 Taylor, completed in the D-8 pay last fall after drilling into Miocene rocks at about 14,000 ft. Zone tested in 702 Grubb was not definitely identified as D-8 but such was expected to prove to be the case. Miocene rocks are believed to lie below 16,000 ft. in this area.

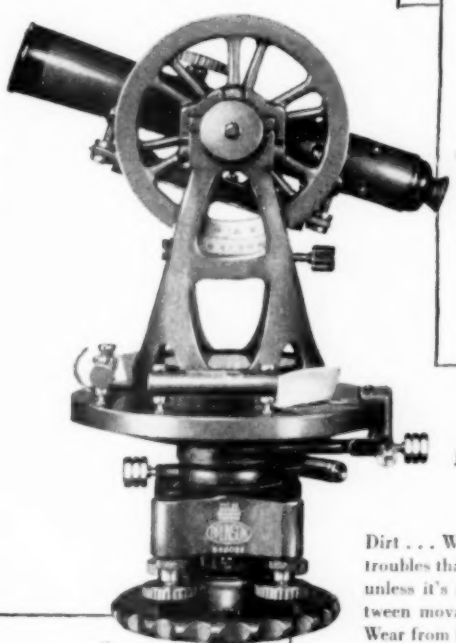
Sunray in Greeley Test

Sunray Oil Corp. was expected to shortly announce location for a wildcat in the central San Joaquin Valley area west of Bakersfield. M J M & M Oil Co. and Norris Oil Co. announced they had farmed out their interest in a 2,000-acre lease block southwest of the Greeley field to Sunray.

Beverly Discovery Shut In

Universal Consolidated Oil Co. continued to keep its Twentieth Century-Fox pool discovery in Beverly Hills field shut in pending completion of oil and gas pipe line outlets. The discovery rated an initial production of about 500 bbl. daily when completed in February in a deeper Miocene sand at about 7,000 ft. Meanwhile the company is proceeding with the second well which last week was nearing a depth of 6,000 ft.

Here's the Answer to the 3 Big Headaches in Transits...



Model No. 50

Dirt . . . Wear . . . Repair—the three big troubles that impair every transit and level unless it's a Brunson. Dirt that gets between movable parts and causes binding. Wear from friction between movable parts that starts reducing accuracy from the day you first use the instrument. Costly maintenance to overcome the effects of dirt and wear.

Brunson has the answer to all three factors: dustproof, ball bearing construction. Dust is sealed out, the lubricant sealed in, and wear is practically eliminated by the smooth ball bearing action. That's why only Brunson instruments maintain their accuracy for years without costly routine maintenance.

Brunson instruments are the new standard of excellence—yet they cost no more. Write today—you'll be glad you did.

BRUNSON
The New Standard of Excellence

DISTRIBUTED EXCLUSIVELY BY
BRUNING
Everything for the Engineer and Draftsman

CHARLES BRUNING COMPANY, INC. • 4700 MONTROSE AVENUE • CHICAGO 41, ILLINOIS

Okadee
"THE PERFECT SEAL"
WRING FIT

No magic . . . No magnetism . . . lapped wring fit of every Okadee Valve disc and seat must pass this test of a perfect sealing surface. (unretouched photo)

. . . Here's What it Means to You in Terms of Valve Service

Flat mating surfaces within .000005", or less, of every set of Okadee valve discs and seats mean absolute shut-off of any material from ammonia gas to asphalt.

How long does this seal last in service? We honestly don't know. Tests under working conditions with propane were stopped after 269,000 operating cycles when no wear or seal failure could be detected. And Okadee valves do not have to be babied in service on corrosive or abrasive materials . . . Thousands of boilers have had Okadee blow-down valves in continuous, trouble-free service for fifteen years or more. If Okadee size-pressure-temperature ranges include your valve applications, Okadee installation will end your problems of valve performance once and for all.

Okadee valves are available in single-disc (one direction) and double-disc (two directions) types; screwed or flanged; ½" to 6" in standard A.S.A. dimensions; steel or semi-steel bodies (other materials to order); stainless steel or stellite seat facings; levers, rack-and-lever, worm-gear, hydraulic, pneumatic, automatic on-off control.

Write for Bulletin 332-C today!

OKd. Okadee COMPANY
332 South Michigan Avenue • Chicago 4, Illinois

ILLINOIS

Two New Oil Pools in Illinois

Two new oil pools, both in Christian County, came in during March.

Illinois oil production for March was 4,882,000 bbl., and the state produced an average of 175,000 bbl. a day.

The two new pools in Christian County, Mount Auburn East and Mount Auburn Central, were discovered by wildcat wells drilled more than 2 miles from producing wells.

Nine of the older pools were extended by wildcat wells drilled within 2 miles of producing wells. The increased producing acreage is in Christopher and North City pools in Franklin County; Cisne North and Clay City Consolidated pools in Wayne County; Concord North and Phillipstown Consolidated pools in White County; Main Pool in Crawford County; Herald Consolidated Pool in Gallatin County; and Thackeray pool in Hamilton County.

One new pay, the Aux Vases sandstone, was opened in Christopher pool, Franklin County.

Seven good wells came in on the north edge of Roland pool in White County during March. The two best wells made initial productions of 552 and 612 bbl. of oil. They were topped, however, by one well in Eldorado pool in Saline County which made an initial production of 750 bbl. of oil.

Wildcat drilling is most active around Mount Auburn and Decatur in Christian and Macon counties. The Mount Auburn pool was discovered in 1943 and the Blackland pool was discovered in July 1953. Interest in the area was stimulated when the discovery well of the Blackland pool was fracture-treated and gave an initial production of 350 bbl. on January 19, 1954. Increased drilling brought in Mount Auburn Central and Mount Auburn East pools in March, and about a dozen other wildcat wells are exploring further oil possibilities in the area.

APPALACHIAN AREA

SOUTHWEST PENNSYLVANIA

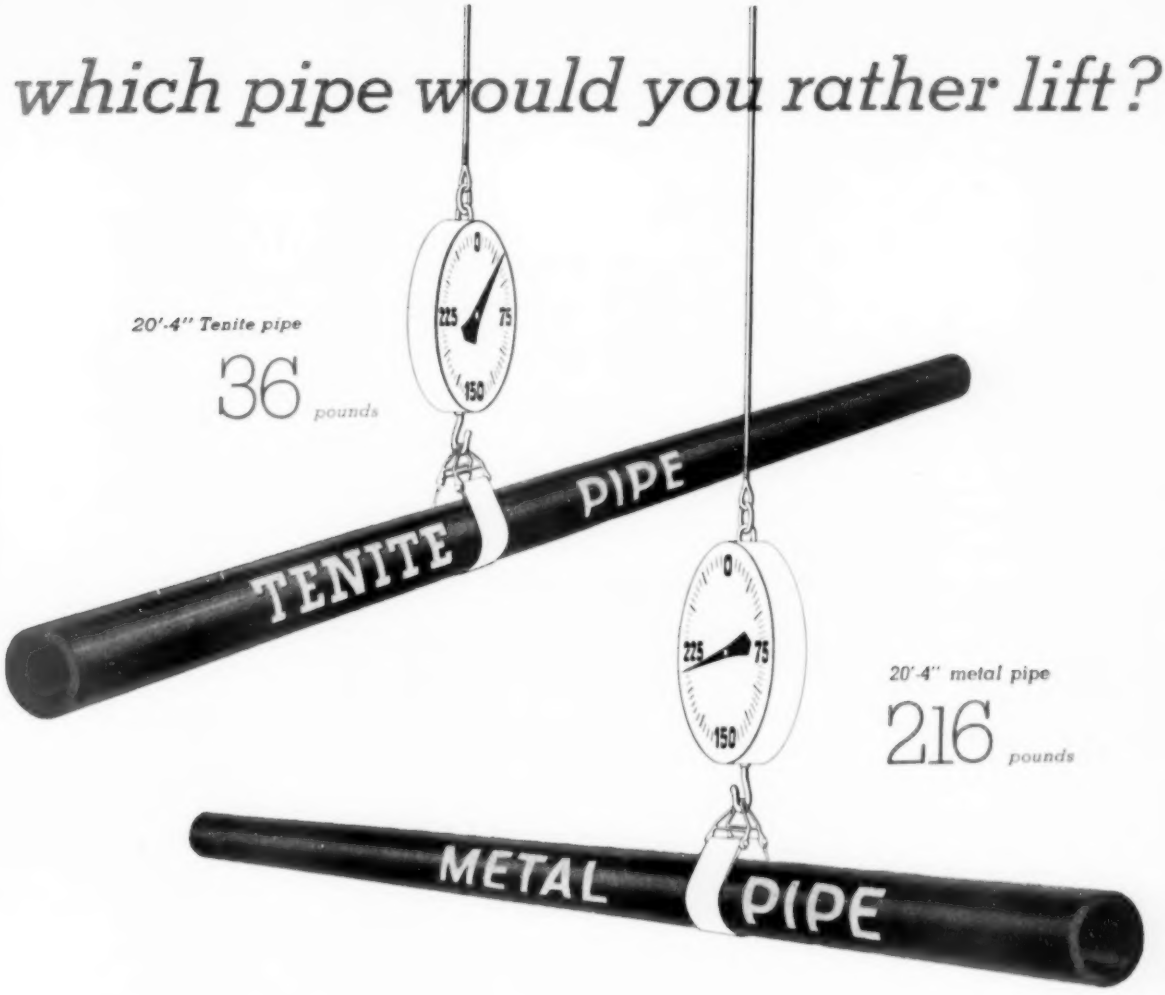
In Connellsville Township, Fayette County, Southwest Pennsylvania, Peoples Natural Gas Co. 1-4030 F. K. Buttermore heirs, wildcat is drilling at 4,268 ft. Cherry Hill Township, Indiana County, Chestnut Ridge Oil & Gas Co. 3 Ralph White, is fishing for the drilling bit at 1,867 ft. Gas testing 20,000 cu. ft., was encountered at 1,853 ft., in the Elizabeth sand. Pine Township, Charles E. Fralich 1 Charles Liesowity, is at 6,600 ft. Unity Township, Westmoreland County, Peoples Natural Gas Co. 4017 J. W. Mills, is drilling at 5,801 ft.

Glade district, Webster County, West Virginia, Nelson W. Taylor et al completed 1 Audra & Harold Crites, wildcat, elevation 2,376 ft., as a dry hole in the lime formation at a depth of 1,667 ft. Roaring Creek district, Randolph County, Seneca Gas & Oil Co. announced 1 D. H. Hill Arnold et al, elevation 2,330 ft., Sago Quadrangle, 1.56 miles south of latitude 38 degrees 55 minutes and .70 mile west of longitude 80 degree 00 minutes.

OHIO

Preston Oil Co. 3 Lucy Love, Section 32, Madison Township, Perry County, an offset to the producer on 1 Beard, topped the Clinton at 3,185 ft. and stopped in sand at 3,222 ft. with 920,000 cu. ft. gas natural. The well

which pipe would you rather lift?



OIL men are big strong fellows . . . but regardless of how big or how strong they are . . . they all tell us that lightweight Tenite pipe is wonderful to handle.

Tenite pipe makes possible considerable savings in installation costs. For example, in a typical case, three men laid 4,000 feet of 4" Tenite pipe in a day; eight men are usually required to lay the same amount of metal pipe. *This meant a clear savings of 62% in labor costs.*

DOES NOT CORRODE . . . Extruded of Tenite Butyrate, the pipe is being used successfully to conduct scur crudes and salt water. The tough plastic is also unaffected by the electrolytic action of soils.

DELIVERS MORE FLUID . . . For any given head loss, Tenite pipe delivers approximately 40% more fluid than does clean metal pipe of the same diameter. This means that many oil men install a 3" Tenite pipe to do the same job which normally would require 4" metal pipe.

PARAFFIN CLOGGING MINIMIZED . . . Because of the smooth, glossy inner surface of the Tenite pipe, some lines have been in service almost 4 years without shutdown for cleaning paraffin. These same lines were formerly cleaned every three weeks.

WRITE OR SEND COUPON . . . if you too would like to avail yourself of the many advantages of Tenite pipe. We'll send technical data and names of suppliers of pipe and fittings. If you have specific problems you wish to talk over with us, our technical staff is at your service.

EASTMAN CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE
Subsidiary of Eastman Kodak Company

TENITE
BUTYRATE
an Eastman plastic

EASTMAN CHEMICAL PRODUCTS, INC.
DEPT. OG4 54, KINGSPORT, TENNESSEE

Please send me further information about TENITE *Butyrate Pipe*

Name .....
Title .....
Company .....
Street .....
City ..... State .....

will probably be tubed without drilling deeper at present. In Hopewell Township, Perry County, Preston well topped the sand in the 2 Mae Hetrick, Section 18, at 2,882 ft., and shut down 23 ft. in with an open flow of 570,000 cu. ft.

In the north extension to New Castle pool in New Castle Township, Coshocton County, 4 H. D. Scott, 2nd Qr., had a good oil showing in Clinton found at 3,211-3,241 ft., and made 175 bbl. in 24 hours after fracturing.

ARKANSAS

New Pays and New Strikes in March

Two new oil discoveries and two new-pay strikes were recorded in Arkansas in March.

C. G. Davis Drilling Co. 1 Strange, C W½ NW NW 14-16s-23w, opened East Stamps field in Lafayette County. Production is from perforations in the Tokio at 2,492-95 ft. The discovery pumped 90 bbl. of 19°-gravity oil per day.

Austral Oil Exploration Co., Inc., Lyons, McCord & Logan completed 1 McGraw, C NE NE SW 34-18s-16w, Union County, to open new oil production in the McGraw area. The producer pumped 79 bbl. of 44°-gravity oil per day from perforations in Tuscaloosa at 3,105-10 ft.

First Pettit production was established in Stephens field, Columbia County. Pan-American Engineering Co. 1 Thomas et al, NW SE 6-16s-19w, pumped 50 bbl. of 43°-gravity oil per day natural from Pettit perforations at 3,544-52 ft.

Leonard W. Phillips reworked 1 Bishop, C NE SE 25-16s-17w, opening Cotton Valley production in North Lisbon field, Union County. The strike pumped 80 bbl. of 35°-gravity oil per day from perforations at 4,442-45 and 4,459-62 ft. in the Cotton Valley.

MICHIGAN

McClure Oil Co., Swan-King Oil Co., Basin Oil Co. 1 Kohn, SE SE NW 1-12n-10w, Reynolds Township oil discovery well, Montcalm County, was being produced, on regular production, at an average rate of 70 to 80 bbl. of oil a day from a Dundee-Reed City zone pay at 3,345 ft., total depth. The well was completed natural with this rating, although well did flow as much as 15 bbl. of oil an hour and was estimated good for as much as 50 bbl. of oil an hour. No new starts had been spudded in the play, but discoverers were making arrangements this week to move to the south 40-acre offset to the 1 Kohn, in the SE NE SW 1-12n-10w.

W. C. Taggart 1 LeMaster, SW SE SE 1-1s-7e, Salem Township Trenton oil discovery producer, Washtenaw County, was tubed this week after 5-in. casing was cleaned of paraffin which had accumulated over the past 9 weeks that well has been on production from a Trenton pay at 4,397 ft., total depth. During the clean-out and tubing operation, the 1 LeMaster flowed as much as 200 bbl. of oil an hour and produced approximately 1,400 to 1,500 bbl. while these operations were in progress. Flow rate was then restricted to the average 250 bbl. a day rate at which it had been produced prior to being tubed.

Production tests in the Traverse, after a 500-gal. acid treatment were still in progress at the C. W. Collin 1 Moore, NE NW SE 31-18n-4e, Lincoln Township wildcat, Arenac County. Well was reported to be producing about 20 bbl. of oil a day on swab tests after acid treatment. Top of Traverse lime was logged at 2,009 ft. and pay, which showed for about 300 ft. of free oil natural in 48 hours, was logged at 2,042-43 ft. Well is presently bottomed out at 2,043 ft.

KENTUCKY

EASTERN KENTUCKY

In Powell County and on Barker Creek, Simon Lebow has completed 5 John M. Ashley for an initial potential of 4 bbl. of oil daily from Corniferous lime topped at 903 ft. and bottomed at 1,036 ft.

In Big Sandy gas field and located in the Pike County sector, United Carbon Co. have completed 51 Colony Coal & Coke Corp. for a Berea sand gas well. After shooting with 200 quarts of nitroglycerin, well gaged 793,000 cu. ft. of gas daily from sand 3,052 to 3,092 ft. Total depth was 3,118 ft. in Devonian black shale.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

Aransas County: Heep Oil Corp. et al 1 Rouquette & Wendell, Lot 8, Block 1, C. B. Lucas Subd., Bay Lands, John G. Smith Sur., A-239. IP 188 BOPD, 9/64-in., 41.5°, perforations 8,284-90 ft. TD 8,300 ft. (New field—West Rockport).

Atascosa County: Wise Drilling Co. 1 Flores, Sur. 1059. Dry. TD 1,958 ft.

Texita Oil Co. and Tri-Mark Oil Co. 1 Steiren et al I&GN Sur. 1753, A-452. Dry. TD 5,500 ft.

Bastrop County: Bass & Abercrombie 1 Barton, Josiah Wilbarger Lge. Dry. TD 2,475 ft.

Duval County: Alaska Steamship Co. and Sam Cunningham 1 Dunn heirs, Section 378, Diego Hinojosa Grant. Dry. TD 4,113½ ft.

Jim Hogg County: K. D. Owen 1 Howe et al, Block 76, Pippin Subd., El Randada Grant. Dry. TD 3,509 ft.

Jim Wells County: South Texas Oil & Gas Co. 1 Hoffman, Share 1, Parcel 2-A, Los Presenos de Abajo Sur. IP 4,600 M.c.f. daily, open-flow potential, perforations 3,862½-71 ft. TD 5,950 ft. (New field—Mary).

Kleberg County: Humble Oil & Refining Co. 1 State Tract 25, Baffin Bay. Dry. TD 9,912 ft.

LaSalle County: Imperial Production Co. 1 Amberson, GS&SF Sur. 11, A-923. Dry. TD 5,153 ft.

McMullen County: J. W. Gorman 3 Hagist Ranch, BBB&C Sur. 3, A-145. Dry. TD 2,900 ft.

Milam County: Byrd Oil Co. and R. E. Smith 1 Henderson, Samuel Jones Sur. Dry. TD 7,805 ft.

San Patricio County: Appell Oil & Gas Corp. 1 Brown, Block 15, J. J. Sumner Subd., Delgado Grant. Dry. TD 5,215 ft.

Inca Drilling Co. 1 LaFarge, Lot 2, Block 17, First Subd., Taft Farm Lands. Dry. TD 6,505 ft.

Starr County: Continental Oil Co. 1-7 Garcia, Survey 913 (Rincon area). Dry. TD 6,114 ft.

H. G. Watson 1 Martinez, Share 12-B, Porcion 70. Dry. TD 2,762 ft.

Webb County: The Texas Co. 5 Martin NCT-1, San Ygnacio Subd., Jose A. Borrego Sur., A-563. IP 683,550 cu. ft. daily, ¼-in., perforations 1,636-44 ft. TD 1,700 ft. (New field—El Ranchito).

Wilson County: L & N Oil Co. 1 Svoboda et al, M. Cavilla Grant 22. Dry. TD 672 ft.

Zapata County: Dillard & Waltermire Drilling Co. 1 Marrs McLean est., Section 3, J. A. Harvey Patition, El Javali Gront. Dry. TD 5,818 ft.

TEXAS GULF COAST

Bee County: J. P. Petkas et al 1 Clara Driscoll est., Isaac Robinson Sur., A-61. Dry. TD 5,820 ft.

DeWitt County: Kirby Oil & Gas Co. 1 Vaughn, Refugio Amador Sur., A-1. Dry. TD 8,320 ft.

Galveston County: Stewart Petroleum Co. 23 Maco Stewart, Joseph Spillman Sur. IP 77 BOPD, 3/16-in., 33°, perforations 6,083-92 ft. TD 6,801 ft. (New pay in Hitchcock field).

Goliad County: Frio Production Co. 1 Powers heirs, Juan Moya & Juan Delgado Sur. Dry TD 4,205 ft.

Harris County: Union Producing Co. 1 Bender est., N. W. Travis Sur., A-769. IPP 30.37 BOPD, 38.1°, perforations 7,072½-73½ ft. TD 8,015 ft. (Extends East Aldine field).

Lone Star Producing Co. 1 Auchincloss et al, Mary Magruder Sur., A-530. Dry. TD 8,755 ft.

Jackson County: Austral Oil Exploration Co. and Reynolds, McCord & Lyons 1 Hillman, Joseph Rector Sur., A-62. Dry. TD 6,968 ft.

Roy R. Gardner et al 1 Trull, Fractional Section 19, Theodore Koch Subd., William Wickham Sur., A-273. Dry. TD 8,710 ft.

Sohio Petroleum Co. 1 Sohio et al, Hugh McGuffin Sur., A-43. Shut down. TD 9,308 ft.

Refugio County: Jack Little 1 Continental fee "22," Section 42, Johnson & Pugh Subd., Antonio de la Vina Sur., A-44. Shut down. TD 6,175 ft.

EAST TEXAS

Anderson County: Sid Katz Exploration Co. 1 Royall National Bank, Stephen Crist Sur., A-15. Dry. TD 5,750 ft.

Freestone County: Stroube & Stroube 1 Williams, H. Landers Sur., A-371. Dry. TD 4,335 ft.

Limestone County: W. E. Walker 1 Heplin, A. Litton Sur., A-351. Dry. TD 2,880 ft.

Panola County: Rudco Oil & Gas Co. 1 Pelham, Elijah Williams Sur. Dry. TD 7,073 ft.

Upshur County: Crescent Drilling Co. and Robert Cargill 1 Brawley, Jackson Crough Sur. Dry. TD 7,950 ft.

Wood County: Hollandsworth Oil Co. 1-A McNeill, Hannah Payne Sur., A-450. Dry. TD 5,219 ft.

F. R. Jackson 2 Smith, Z. Jackson Sur., A-333. Dry. TD 4,648 ft.

WEST CENTRAL TEXAS

Callahan County: Jack A. Stroube 1 Moore, 4-1-SPRR. Dry. TD 2,007 ft.

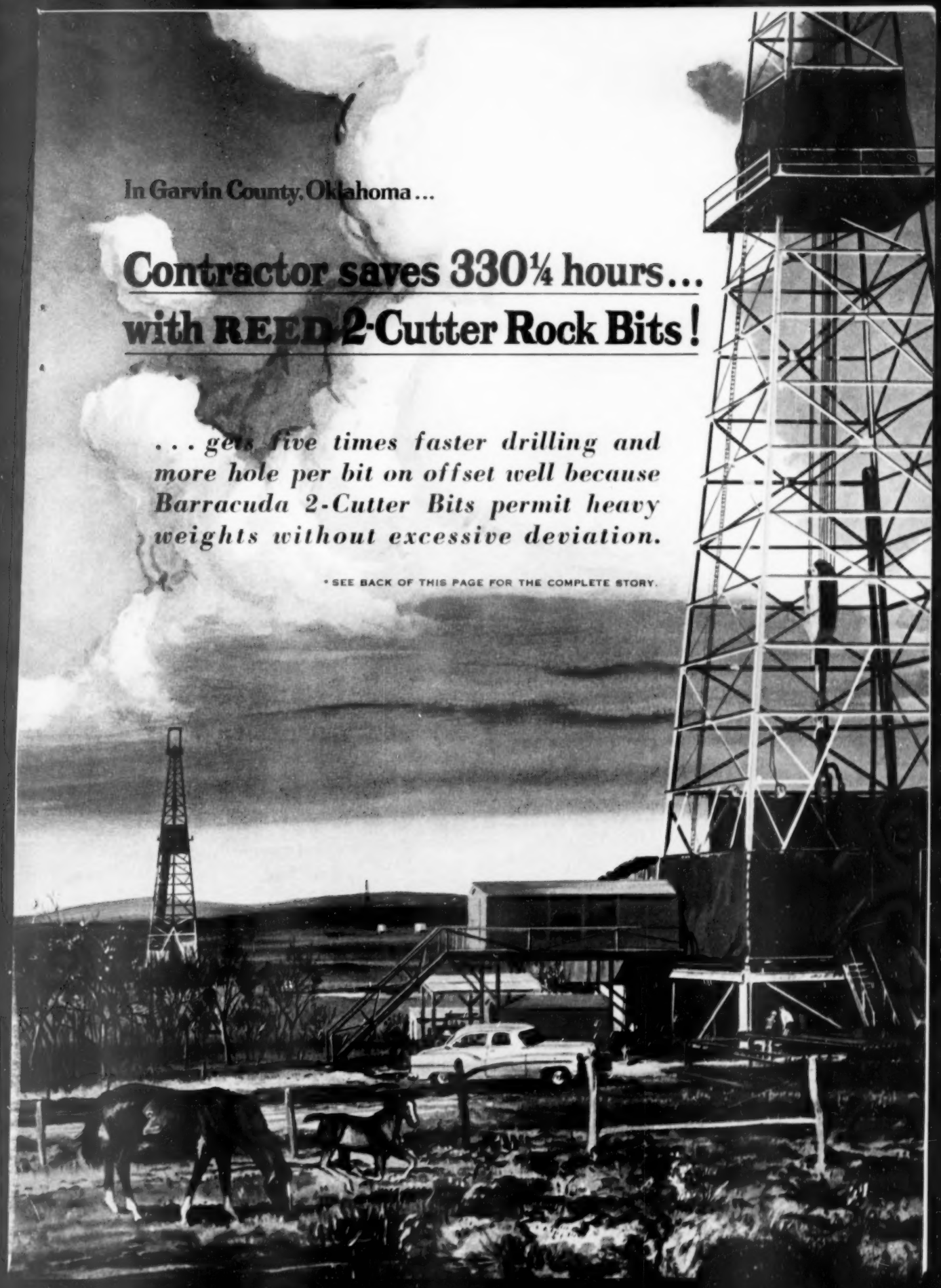
Coleman County: Davis Brothers and Ab-Tex Drilling Co. 1 Newton, Sec. 1, San Augustine Sur. 519. Dry. TD 3,920 ft.

Jones County: Great Lakes Carbon Corp. 3 Bryant, 15-4-H&TC. Dry. TD 3,747 ft.

S. C. Herring Drilling Co. 1 Kreul, 186-1-BBB&C. Dry. TD 3,440 ft.

H. G. Lewis 1 Hardin, Sec. 14, D&DA Sur. Dry. TD 2,152 ft.

Nolan County: T. D. Humphrey & Sons 1 Withers, 69-21-T&P. Dry. TD 6,470 ft.


In Garvin County, Oklahoma...
Contractor saves 330¼ hours...
with REED 2-Cutter Rock Bits!
...gets five times faster drilling and more hole per bit on offset well because Barracuda 2-Cutter Bits permit heavy weights without excessive deviation.
* SEE BACK OF THIS PAGE FOR THE COMPLETE STORY.

REED Barracuda 2-Cutter **ROCK BITS**

DEPTH OF HOLE	FOOTAGE EACH BIT	HOURS BIT RUN	WT. ON BIT IN 1000 LBS	DEVIATION
8798				1½°
8889	91	13	35	¾°
8940	51	5	40	¾°
9017	77	9	40/60	2°
9171	154	16½	35	1¾°
9252	81	10	40/60	2¾°
9301	49	9	35	2½°
9339	38	6¼	35	2½°
9382	43	10	35	1¾°
9393	11	2½	25	1¾°
TOTAL	595 feet	81¼ hours		

CONVENTIONAL BITS

DEPTH OF HOLE	FOOTAGE EACH BIT	HOURS BIT RUN	WT. ON BIT IN 1000 LBS	DEVIATION
8765				7°
8832	67	29	10	8°
8900	68	31	10	8°
9047	147	45	10	8°
9144	97	43		
9174	30	37		
9200	26	26		
9276	76	48		
9303	27	32		
9325	22	22		
9337	12	16½		
9350	13	24		
9378	28	36		
9401	23	22		
TOTAL	636 feet	411½ hours		

Contractor saves 330¼ hours... with REED 2-Cutter Rock Bits!

THE TRIGG DRILLING COMPANY, drilling two offset wells in Garvin County, Oklahoma, for a major oil company, made competitive runs between 8700 and 9400 feet.

On one well they used conventional bits and on the other they used the new **REED** Barracuda Twin-Blast 2-Cutter Bits.

Formations were Springer Shale, Base Springer, Caney Top and Woodford. Both rigs had 7¾ x 18 pumps with 6½" liners, and both used 9" bits.

Here's what happened:

On the well using conventional bits, drilling weights were about 10,000 pounds and deviations reached 8 degrees. Rate of penetration averaged only 1.54 feet per hour and 13 bits were used to drill 636 feet.

With **REED** *Barracuda Bits, weights of from 35,000 to 60,000 pounds were used and deviations never exceeded 2¾ degrees. Rate of penetration averaged 7.32 feet per hour (a record for this field) and only 9 bits were used to drill 595 feet.* This contractor saved 330¼ hours drilling time, the cost of four rock bits, and four round trips. Excerpts from the bit records, shown in the tables above, give the story in detail.

This is an outstanding example of the benefits that result from running **REED** Twin-Blast Rock Bits and following the suggestions of your **REED** representative as to drilling weight, pump volume and rotary speed.

REED ROLLER BIT COMPANY

HOUSTON, TEXAS

4775 A

WILDCAT COMPLETIONS

Elev. 2,203 ft., Caddo 6,297 ft., Ellenburger 6,398 ft.

Shackelford County: George Hauk 1 Reames, Sec. 25, BAL Sur. Dry. TD 3,437 ft.

Roark-Hooker-Roark 2-A Elliott, Sec. 9, LAL Sur. IPP 41 BOPD, 44°, Mississippian 4,188-4,201 ft. TD 4,330 ft.

Stephens County: W. J. Rhodes 1 Rogers, 28-5-T&P. Dry. TD 2,454 ft.

Stonewall County: Benedum-Trees Oil Co. 1 Pumphrey, 15-B-AB&M. IPP 91 BOPD, 41°, pay 4,024 ft. TD 4,285 ft.

Taylor County: Saxon Exploration Co. 1 Bacon, 31-1-SPRR. IP 123 BOPD 34°, pay 4,006 ft. TD 4,802 ft.

Throckmorton County: C. N. Valerius 1-E Travis CSL, Travis CSL Sur. 58, 9 miles N Throckmorton. IPP 124 BOPD, Strawn 4,010-20 ft. TD 4,022 ft.

NORTH TEXAS

Archer County: Frank B. Harvey 1 Prideaux, J. Saunders Sur., A-644. Dry. TD 3,850 ft.

Harrold Shappell 1 Turbeville, Blk. 170, R. Carson Sur. Dry. TD 1,513 ft.

Baylor County: Concho Petroleum Co. and Signal Oil & Gas Co. 1 Caussey, T&NO Sur. 161. Dry. TD 5,117 ft.

J. B. Randle and P. W. Pitzer 1 Martin, S. T. Sheffield Sur., A-286. Dry. TD 5,552 ft.

Clay County: Clay Oil Co. 1 Dale, Sec. 18, Halsell Subd. 2, 6 miles SW Henrietta. IPP 120 BOPD, 40°, upper Strawn 4,031-36 ft. TD 6,038 ft.

Cooke County: Kay Kimbell 1 Reagan, A. Eubanks Sur., A-1198. Dry. TD 5,618 ft.

Grayson County: Howell, Holloway & Howell 1-B Freeman, D. S. Southmayd Sur., A-1077. IP 168 BOPD, 20/64-in., 32°, Ellenburger 6,748 ft. TD 6,954 ft.

Jack County: Bridwell Oil Co. 1 Lindsey, R. Hendrix Sur., A-284. Dry. TD 3,525 ft.

Grace-Schlittler 1 Snyder, J. J. Gholson Sur., A-229. IP 126 BOPD, 13/64-in., 42°, conglomerate 4,322 ft. TD 4,353 ft.

Knox County: The Texas Co. 1-B Roy Lebus NCT-1, 123-13-H&TC. Dry. TD 6,513 ft.

Wichita County: Knight Drilling Co. 1 Parker, Sec. 24, Palo Pinto CSL. Dry. TD 202 ft.

Perry & Woody 1 Flusche, 32-5-H&TC. Dry. TD 1,935 ft.

Wilbarger County: Ted A. Norwood 1-I Waggoner, J. Poitevent Sur., A-531. Dry. TD 2,255 ft.

Young County: Alvin Clifton 1 Bailey, TE&L Sur. 8. Dry. TD 431 ft.

Menefee & Parsley 1 McCary, TE&L Sur. 1585. Dry. TD 1,402 ft.

WEST TEXAS

Andrews County: Cities Service Oil Co. 1-S University, 27-10-University Lands Sur., 16 mi. SW Andrews. IP 77 BOPD, 18-/64-in., 33°, pay 4,268 ft. TD 4,460 ft.

Hunt Oil Co. 1 J. M. White, 13-A34-PSL, 11 mi. N Andrews. IP 496 BOPD, 12/64-in., 44°, Ellenburger 13,270 ft. TD 13,560 ft.

Borden County: Falcon, Seaboard, Green & McSpadden 1 Clayton & Johnson, 6-32-T4N-T&P. IP 198 BOPD, 10/64-in., 45°, Pennsylvanian 8,236-40 ft. TD 8,266 ft.

Crockett County: A. O. Wellman & Sons 1-78 Parker, 78-1-I&GN. Dry. TD 2,208 ft.

Dawson County: Stanolind Oil & Gas Co. 1 Dyer, 47-34-T4N-T&P. Dry. TD 9,408 ft. Elev. 2,831 ft., reef 9,288 ft.

Gaines County: Hamilton Bros. 1 Stimson, 301-G-CCSD&RGNG. Dry. TD 5,350 ft.

Howard County: Earle M. Craig, Jr. 1 Muse & Newsom, 31-32-T3N-T&P. Dry. TD 8,380 ft. Elev. 2,726 ft., reef 8,346 ft.

Lone Star Producing Co. 1 Haney, 22-32-T2N-T&P, 12 mi. N Big Spring. IP 325 BOPD, 3/4-in., 44°, Mississippian 9,880-9,919 ft. TD 9,936 ft.

Pecos County: Ralph Goble 1 White & Baker, 17-Z-TCRR. Dry. TD 1,900 ft.

Runnels County: F. Kirk Johnson 1 Nixon, Anton Faber Sur. 400, A-187. Dry. TD 4,826 ft.

Sid Katz Exploration Co. 1 Lehman, Blk. 64, T. M. Holmes Sur. 334. Dry. TD 4,506 ft. Elev. 1,768 ft., Caddo 4,335 ft.

Sojourner Drilling Co. 1 Meadows, Sec. 358, T. R. Webb Sur. Dry. TD 4,470 ft.

Schleicher County: American Trading & Production Co. 1 Sauer, 191-A-HE&WT. Dry. TD 7,795 ft. Elev. 2,413 ft., Ellenburger 7,128 ft., Wilberns dolomite 7,480 ft., sand 7,620 ft.

Scurry County: Lone Star Producing Co. 1 Harrell, 140-2-H&TC. Dry. TD 7,505 ft. Elev. 2,267 ft., Ellenburger 7,377 ft.

Tom Green County: Carter & Carter 1 Kent, Sec. 167, District 11, SPRR Sur. Dry. TD 4,760 ft. Elev. 1,971 ft., Strawn 4,590 ft.

Stanolind Oil & Gas Co. 1 Hoblett & Jacobs, Sec. 1131, C&MRR Sur., 5 mi. S Christoval. IP 242 BOPD, 12/64-in., Strawn 5,380 ft. TD 5,539 ft.

Upton County: Humble Oil & Refining Co. 1-B Corbett, 19-2-GC&SF, 10 mi. SW Rankin. IPP 45-BOPD, 38°, pay 6,363 ft. TD 6,855 ft.

SOUTHEAST NEW MEXICO

Eddy County: Continental Oil Co. 1 Tom Nolan-Federal, 4-16s-27e. Dry. TD 9,968 ft. Elev. 3,580 ft., Devonian 9,162 ft., Ellenburger 9,823 ft.

U. S. POOL MAPS

Here are 16 maps of the most active oil areas in the United States. Shows both oil and gas pools.

These maps are lithographed in three colors and give locations and names of both oil and gas fields.

Small scale—Journal page size—they are convenient for ready reference in field or office. Survey lines make easy plotting of new wildcat locations.

Areas Covered: 1) California, 2) Intermontane Basins, 3) Northern Wyoming, 4) Williston Basin, 5) Kansas, 6) Julesburg Basin, 7) Hugoton Area, 8) Oklahoma, 9) North and East Texas, 10) Permian Basin, 11) West Gulf Coast, 12) South Texas, 13) East Gulf Coast, 14) Miss.-La.-Ark., 15) Tri-State Area, 16) Michigan.

$2.00 a copy

Write for quotation—50 or more

Reader Service Department

The Oil and Gas Journal

Box 1260 **Tulsa 1, Okla.**

The noted series from the Oil and Gas Journal now available in one volume

FUNDAMENTALS OF

RESERVOIR ENGINEERING

By JOHN C. CALHOUN, Jr.

A clear and concise discussion of the principles of petroleum reservoir engineering as applied to improve techniques in oil and gas recovery. Deals with:

- Behavior of Reservoir Fluids
- Study and Treatment of Rock Properties
- Fluid Flow in Porous Media
- Reservoir Energies and Forces
- Estimation of Oil in Place and Oil Production

With many illustrations, diagrams and graphs

ORDER TODAY—USE THIS COUPON

OIL AND GAS JOURNAL, Tulsa 1, Oklahoma

Please send.....copies of FUNDAMENTALS OF RESERVOIR ENGINEERING, @ $6.00.

Name.....

Address.....

City.....State.....

☐ Payment enclosed ☐ Purchase Order Enclosed ☐ Send Bill

WILDCAT COMPLETIONS

ILLINOIS

Christian County: Calvert Drilling Co. 1 Yockey, SW NE NE 36-15n-2w. Dry. TD 1,955 ft.

Clay County: Aurora 1 Paul, NW NE NE 34-3n-5e. Dry. TD 3,112 ft.

Crawford County: C. W. and J. E. Kendall 1 Crozier, SW SW SE 13-6n-12w. IPP 5 BOPD, Aux Vases 1,556-66 ft. TD 1,571 ft. Discovery of New Hebron, East.

Hamilton County: National Associated Petroleum Co. 1 Campbell, NE SE SW 22-5s-7e. Dry. TD 3,530 ft.

Jackson County: R. L. Grossman 1 O'Daniell, SE NE SE 23-8s-5w. Dry. TD 1,020 ft.

Macon County: Collins Bros. 1 Fath, NW SE SW 32-15n-2e. Dry. TD 2,505 ft.

Vernon Jarvis 1 Gemmer, NW NW NW 7-15n-1e. Dry. TD 1,992 ft.

Marion County: W. J. McGlasson 2 Gerrish, NW SE NE 8-3n-1e. Dry. TD 1,714 ft.

Washington County: Canter Drilling Co. 1 Anderjeski, SW NE NW 36-1n-1w. Dry. TD 1,555 ft.

Wayne County: National Associated Petroleum Co. 1 Wilkenson, SW SW NE 22-2n-5e. Dry. TD 2,758 ft.

INDIANA

Dubois County: James O. Wood 1 Cummings & Donahue SW SW SE 36-2s-3w. Dry. TD 364 ft.

Posey County: Paco Petroleum Co. 1 Martin-Blankenberger, SE SE NE 24-4s-12w. Dry. TD 2,265 ft.

Vigo County: T&H Corp. 1 Singhurst Comm., SE NW SW 9-10n-8w. Dry. TD 1901 ft.

WESTERN KENTUCKY

Henderson County: Kendall & Davis 1 Lockett-Topp SW SW NW 2-N-24. Dry. TD 2,575 ft.

W. E. Styles 1 Gabbart, NW NW SW 11-P-21. IPP 145 BOPD McClosky 2,573-79 ft. TD 2,678 ft. Opens Smith Mills, South pool.

Union County: Basin Drilling Co. and Walter Sargent 1 Hancock, SW SE NW 22-P-21. Dry. TD 2,757 ft.

Eakle and Holder Drilling Co. 1 Hancock, SE NE NW 14-O-19. Dry. TD 2,764 ft.

MICHIGAN

Isabella County: Socony-Vacuum Oil Co., Inc. 1 Riggs, SE NW NW 32-13n-5w. Dry. TD 3,537 ft. in Dundee.

Lenawee County: Monarch Oil Co. and Milliam J. Morriss 1 Halliday, NE NE SE 1-5s-3e. Dry. TD 1,573 ft. in Dundee.

Montcalm County: McClure Oil Co. 1 Kohn, SE SE NW 1-12n-10w. IPF 80 BOPD, restricted, 43.4°, Dundee 3,251 ft., Reed City Zone pay 3,344-45 ft. TD 3,345 ft. (New pool.)

Ottawa County: Muskegon Development Co. 1 Mergener, NE NE NE 9-8n-15w. Dry. TD 1,824 ft. in Traverse lime.

Washtenaw County: Sun Oil Co. 1 Buss, NW NW NW 8-3s-4e. Dry. TD 1,378 ft. in Monroe.

Washtenaw County: W. C. Taggart 1 LeMaster, NW SE SE 1-1s-7e. IPF 250 BOD, highly restricted, Trenton 4,247 ft. Pay 4,347-97 ft. TD 4,397 ft. (New pool.)

NEW YORK

Chautauqua County, Westfield Township: Everett Kiester, Sr. 1 Westfield quadrangle. IP 20 M.c.f., white Medina sand 2,263 ft. TD 2,271 ft. (Gas discovery.)

WEST VIRGINIA

Webster County, Glade district: Nelson W. Taylor et al 1 Audra & Harold Crites, elevation 2,376 ft. Dry. Lime TD 1,667 ft.

GEORGIA

Glynn County: E. B. La Rue 1 Curry, Lot 12, Block 92. Dry. TD 2,050 ft.

Walker County: T. O. Posey 2-B Vernon Close, Lot 33, Land District 7. Dry. TD 3,000 ft.

MISSISSIPPI

Adams County: John S. Callon and D. A. Biglane 1-E Armstrong, 26-5n-3w. Dry. TD 6,847 ft. Elev. 167 ft., Wilcox 4,717 ft., base Baker shale 6,847 ft.

SOUTH LOUISIANA

Pan American Southern Corp. 1 Harmon, 44-8s-1e. IP 670 BOPD and 6,000 M.c.f. daily, 3/6-in., 48.8°, perforations 11,742-52 ft. TD 12,250 ft. (New pay in North Crowley field).

Lafourche Parish: Humble Oil & Refining Co. 2 Delta, 34-18s-20e. IP 292.8 BOPD. 1/6-in., 37.3°, perforations 10,978-88 ft. TD 15,115 ft. (New pay in Bully Camp field).

Pointe Coupee Parish: The Texas Co. 1 Callicott, 33-5s-9e. Dry. TD 10,600 ft.

Terrebonne Parish: Union Oil Co. of California 11-B L. L. & E., 7-18s-16e. IP 153 BOPD, 8/64-in., 33.4°, perforations 5,923-50 ft. TD 7,950 ft. (New pay in Lake Hatch field).

USE KINZBACH MILLS
for every cutting or milling job

Type "A" Mill

Type "D" Mill

Type "H" Mill

Type "I" Mill

Use Kinzbach Milling Tools for every whipstocking or metal cutting operation. Bodies are made of high quality steel, shaped for best cutting results. They have high-speed tool steel inserts which are ground and set at the most efficient angle for fast, uniform cutting action. Shown here are four popular models—see your Kinzbach Catalog for a description of the complete series of Kinzbach milling tools.

KINZBACH TOOL CO INC

Export Office: 74 Trinity Pl. New York, N.Y.

KINZBACH TOOL CO., INC. • P. O. BOX 277 • HOUSTON, TEXAS

WATCH THESE DECALS GO BY!

You, too, can take advantage of the FREE advertising space available on your cars and trucks by using STAN RAMSEY DECALS. They cost less than hand-painting and they last for years and years. You can have 125 decals, size 10" x 10" for as little as $1.33 each. Write, wire or phone, today!

STAN RAMSEY COMPANY, INC.
2727 NORTH OKLAHOMA, OKLAHOMA CITY, OKLA.

WILDCAT COMPLETIONS

NORTH LOUISIANA

Bossier Parish: John F. Mitchell 1 Samuel M. Hayams, Sr., C NE SE 18-23n-11w. Dry. TD 3,100 ft.

Richland Parish: Atlantic Refining Co. 1 Franklin, strat test, 30-18n-7e. Dry. TD 2,800 ft.

Atlantic 1 Caroline Williams, strat test, 8-18n-9e. Dry. TD 3,100 ft.

ARKANSAS

Columbia County: Pan-American Engineering Co. 1 McClurken et al, C NE SW 6-16s-19w. Dry. TD 6,723 ft.

Texas Crude Co. et al 1 Ola Pierce Davis, C SE NE 7-17s-20w. Dry. TD 7810 ft.

Union County: Leonard W. Phillips 1 Bishop, C NE SE 25-16s-17w. IPP 80 BOPD, Cotton Valley 4,442-45, 4,459-62 ft., 35°. TD 6,403 ft. (New pay discovery in North Lisbon field.)

Burnett Production Co. 1 Hudson, C NW SE SW 6-19s-13w. Dry. TD 3,553 ft.

OKLAHOMA

Caddo County: Cities Service Oil Co. 1 Inla, SW SW SW 33-7n-12w. Dry. TD 5,001 ft.

Comanche County: Kingwood Oil Co. 1 Collier, NW NW SW 27-3n-9w. Dry. TD 8,654 ft.

Garvin County: Webco Drilling Co. 1 Lunsford, SE SW SW 8-3n-3e. Dry. TD 2,250 ft.

Jefferson County: R. B. Farris 1 Howard et al, NW NW SW 24-6s-5w. Dry. TD 3,484 ft.

Kay County: Time Petroleum 1 Thompson, NE NE SW 10-28n-1e. Dry. TD 4,023 ft.

Lincoln County: Wilcox Oil Co. 1 Hagar, NW NW SE 3-15n-3e. Dry. TD 5,075 ft.

K&H Drilling Co. 1 Westfall, SW SW SW 18-16n-3e. Dry. TD 4,755 ft.

Logan County: D&L-Lynn Drilling Co. 1 Russell, SE SE NW 19-17n-1e. Dry. TD 5,347 ft.

Major County: White Eagle et al 1-B Coppock, NE SW SW 5-21n-11w. IPF 144 BOPD, Mannford 6,896-6,950, 182 BOPD, Miss. 7,182-7,254 ft., 34°, 32.4°, 8/64-in., 18/64-in. TD 7,287 ft. (Oil discovery.)

Osage County: Norbla Oil Co. 1 Osage, SW SW SW 34-25n-6e. Dry. TD 2,916 ft.

Mundy 1 Osage, NE NW SW 28-27n-10e. Dry. TD 2,075 ft.

Pawnee County: Harry J. Schafer et al 1 Rowe, NE NW SW 14-23n-5e. Dry. TD 3,704 ft.

Stephens County: J. E. Jackson 1 Payne, SW SE SE 21-1n-5w. Dry. TD 5,625 ft.

Samedan 1 Burkhart, NE SW SE 27-1n-5w. IPP 103 BOPD, lower Hoxbar 5,195-5,234 ft., 29°. TD 5,434 ft. (Oil discovery.)

Tillman County: Childress Drilling Co. 1 Holloman, SE SW SE 6-2s-17w. Dry. TD 2,174 ft.

KANSAS

Barber County: Barbara Oil Co. 1 Brock, NE NE NW 17-34s-15w. Dry. TD 5,549 ft.

Barton County: Petroleum, Inc. and Appleman 1 Zecka, SE SE NE 18-17s-11w. Dry. TD 3,363 ft.

Butler County: Rex & Morris et al 1 Smith, SW SW NW 13-25s-7e. Dry. TD 2,798 ft.

Ellis County: Okmar Oil Co. 3 Albert, SW NE SW 10-11s-19w. IPP 89 BOPD, Lansing 3,288-91 ft., 31°. TD 3,563 ft. (New pay at Sessins pool.)

Graham County: Birmingham & Bartlett 1 Johnson "C," SW SW SE 10-10s-23w. Dry. TD 4,205 ft.

Harper County: Beardmore 1 Williams, SE SW SW 11-31s-8w. Dry. TD 4,493 ft.

Pawnee County: Cities Service Oil Co. 1 Risse, NE NE NE 14-20s-20w. IPP 506 BOPD, Sooy 4,171-82 ft. TD 4,540 ft. (Opens Shiley pool.)

Morrison 1 Vaughn, NW NW NW 20-20s-18w. Dry. TD 4,079 ft.

Phillips County: National Cooperative 1 Becker, SW SW SW 29-4s-20w. Dry. TD 3,660 ft.

Rice County: Petroleum, Inc. 1 Malone "C," SW NW SW 25-20s-10w. IPP 25 BOPD, Simpson 3,306-14 ft. TD 3,385 ft.

Rooks County: H. G. Kaiser 1 Dick, SW SE SE 21-10s-19w. Dry. TD 3,732 ft.

Rush County: Virginia Drilling Co. and Sohio Petroleum 1 Webs, NE NE SE 29-18s-20w. Dry. TD 4,655 ft.

Sedgwick County: Carlock 1 Downing, SE SE SE 25-25s-1e. Dry. TD 3,062 ft.

Sheridan County: Peel-Hardman 1 Vaughn, SE SE SW 2-7s-29w. Dry. TD 4,218 ft.

W. W. Sauvage 1 Boggs, NE NE NE 22-7s-30w. Dry. TD 4,600 ft.

Sumner County: Herndon Drilling Co. 1 Smith, SE NE SE 26-34s-1w. Dry. TD 4,416 ft.

Trego County: Herman Kaiser 1 Howat, NW NW SW 1-11s-23w. Dry. TD 4,041 ft.

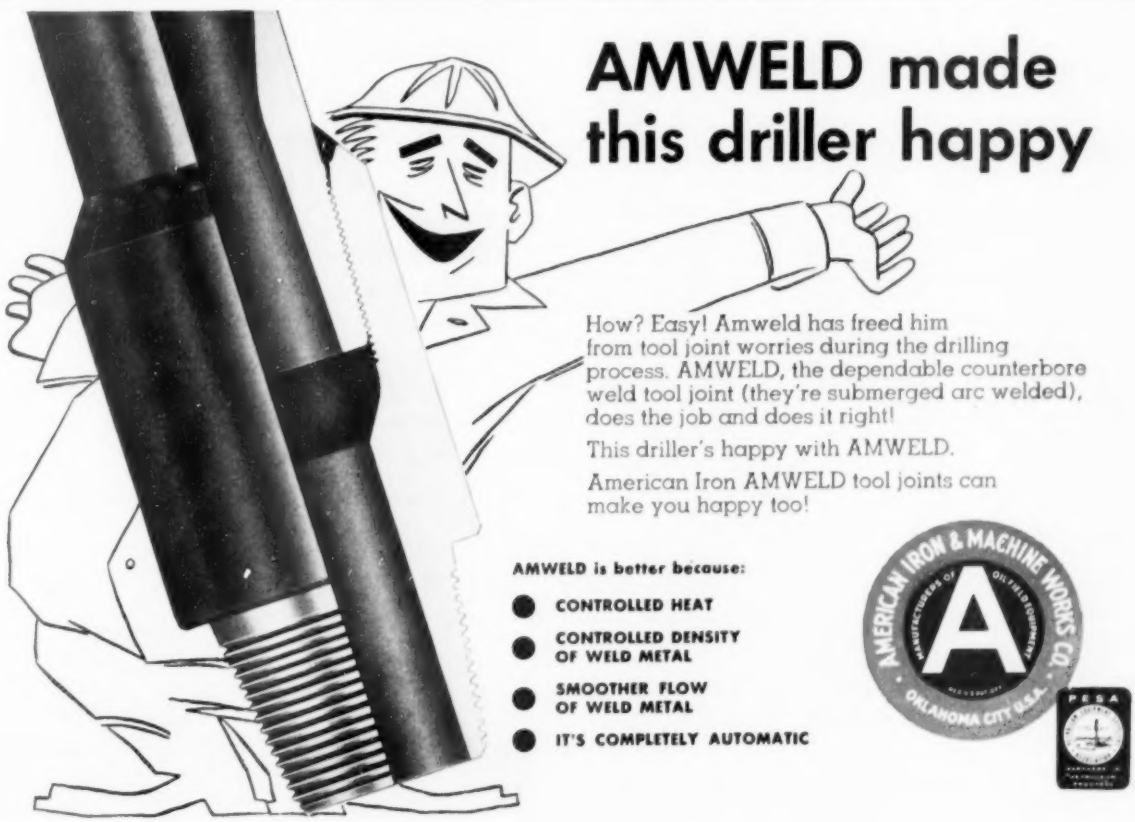
WESTERN NEBRASKA

Cheyenne County: British-American 1 Weible, C NE SW 34-17n-51w. Dry. TD 5,152 ft.

Sioux County: Trimark Oil and Powder River Oil Corp. 1-A Carpenter, C NW SW 7-26n-57w. Dry. TD 5,760 ft. in Dakota.

NORTH DAKOTA

Pierce County: J. P. Owen 1 Herman Tjon, SW NW 18-156n-73w. Dry. TD 3,115 ft. in Lodgepole.


AMWELD made this driller happy
How? Easy! Amweld has freed him from tool joint worries during the drilling process. AMWELD, the dependable counterbore weld tool joint (they're submerged arc welded), does the job and does it right!
This driller's happy with AMWELD.
American Iron AMWELD tool joints can make you happy too!
AMWELD is better because:
CONTROLLED HEAT
CONTROLLED DENSITY OF WELD METAL
SMOOTHER FLOW OF WELD METAL
IT'S COMPLETELY AUTOMATIC
AMERICAN IRON & MACHINE WORKS CO.
OKLAHOMA CITY U.S.A.
PESA

WILDCAT COMPLETIONS

CALIFORNIA

Glenn County: E. L. Doheny, operator 1 N. G. C.-Blosser, 21-20n-2w. Dry. TD 5,500 ft.

Kern County: Capital Co. 44-16 Westates, 16-28-27e. Dry. Olcese 4,065, TD 6,775 ft.

Humble Oil & Refining Co. 1 E. Pressler, 34-32s-29e. Dry. TD 6,000 ft.

McMullen & Grother 26 Bates estate, 20-25s-19e. Dry. TD 1,853 ft.

Oceanic Oil Co. D-2 C.W.O.D., 7-32s-23e. Dry. TD 3,086 ft.

Superior Oil Co. 36 K.C.L.-31, NE NW 36-30s-26e. IPF 105 BOPD, 9/64-in. choke, 38° gravity, perfs. 8,096-8,101 ft. in Stevens sand, TD 8,250 ft. (West extension to 1-well Old River field.)

Tide Water Associated Oil Co. 54 T.W.A., 18-28s-25e. Dry. TD 12,563 ft.

Madera County: Trico Oil & Gas Co. 3 Howard, 35-11s-14e. Dry. TD 4,001 ft.

Merced County: Richfield Oil Corp. 1 Crocker-Huffman, 4-6s-15e. Dry. TD 699 ft.

San Benito County: Eddie Fisher 21 De Alvarez, 5-19s-10e. Dry. Deepened from 3,174 ft., TD 4,644 ft.

Santa Barbara County: Richfield Oil Corp. 1 Fisher, 2-9n-27w. Drl. TD 9,505 ft.

Solano County: W. W. Holmes, Oper. 1 Standard-Snyder, 21-8n-1e. Dry. TD 5,498 ft.

Tulare County: L. A. Gwynne et al 1 Sanborn, 4-22s-27e. Dry. TD 1,323 ft.

WYOMING

Converse County: T. W. Eggleston 1 Government, NE NE SW 5-40n-67w. Dry. TD 8,575 ft. in Newcastle.

Natrona County, West Salt Creek: Marsh & Pursel 2 Government, SE NE NE 6-39n-79w. Dry. TD 834 ft. Fishtooth test.

Weston County, Lake Creek area: Steele Oil Co. 1 Lake, SW SE SW 12-44n-61w. Dry. TD 2,289 ft. in Newcastle.

MONTANA

McCone County, Weldon area: Socony-Vacuum, Pegasus Division, F-11-20 P. Waller, C NW NW 20-21n-46e. Dry. TD 9,821 ft. in Winnipeg.

UTAH

Grand County, Cisco townsite: D. & N. Mining 2 Murray B1, Blk. 8, Sec. 24, 21s-23e. IPF 27 BOPO, Morrison discovery, new field. TD 610 ft.

COLORADO

Adams County: Hunt Oil Co. 1 Koch, SW SW NE 34-1s-68w. Dry. TD 9,963 ft. in Lyons.

Logan County: British-American 1-X Brainard, NW NW SW 28-9n-53w. IPP 221 BOPD, "D" sand discovery, East Mt. Hope. TD 5,073 ft.

Anderson-Prichard Oil Corp. 1 Good, C SW NW 6-6n-54w. Dry. TD 5,306 ft.

Anderson-Prichard 1 Chambers, SE NE NW 30-6n-54w. Dry. TD 5,240 ft.

Balderson Denver Drilling Co. 1 Hosford, C SE NE 5-7n-55w. Dry. TD 5,635 ft.

Miracle & Fifer 1 State, C NW NE 36-10n-54w. Dry. TD 5,011 ft.

South Texas Development Co. 3 Budin, C SW SE 12-8n-55w. Dry. TD 5,369 ft.

West Central Petroleum, Inc. and Twin T. Drilling Co. 1-28 Keester, C SE SW 28-10n-55w. Dry. TD 6,890 ft. upper Satanka.

Morgan County: Denver Basin et al 1 Cora Lockling esetate, C NW SE 4-5n-59w. Dry. TD 6,601 ft.

Washington County: Halbert & Jennings 1 Yates, NW NW SE 27-1s-55w. Dry. TD 5,005 ft.

Jackpot Oil Co. 1 Nickell, NE NE NE 30-5s-55w. Dry. TD 5,230 ft.

Weld County: L. P. McArthur 1 Kingsbury Ranch, NW NE SE 14-3n-61w. Dry. TD 6,643 ft.

New World Oil, Inc. 1 Krieger, NW NW SW 10-4n-61w. Dry. TD 6,655 ft.

MANITOBA

California Standard 4-3 Tilston, LSD 4, 3-6-29w1. Dry. TD 3,827 ft.

SASKATCHEWAN

Tide Water 1 Triumph Crown, LSD 8, 21-34-15w3. Dry. TD 3,050 ft.

Seaboard-Tide Water 14-14 Cabri Crown, LSD 14, 14-19-19w3. Dry. TD 3,290 ft.

Canada Southern 1 Hoosier, LSD 6, 31-31-27w3. Viking gas well. TD 2,965 ft. PBTD 2,448 ft.

Tide Water-Imperial 1 South Kisbey Crown, LSD 16, 34-7-6w2. Dry. TD 8,615 ft.

Imperial 7, 30-34-10 Kuroke, LSD 7, 30-34-10w2. Dry. TD 3,968 ft.

Rio Prado 4-22 Edam, LSD 4, 22-49-19w3. Dry. TD 2,028 ft.

Socony-Wood, South, 7-12 Pennant, LSD 12, 7-18-16w3. Dry. TD 3,320 ft.

Rio Prado 1-9 Calder, LSD 1, 9-26-31w1. Dry. TD 1,651 ft.

ALBERTA

Baysel - Socony - Chancellor Syndicate 4-27 CPR, LSD 4, 27-24-21w4. Dry. TD 6,054 ft.

Pacific 2 Consort, LSD 7, 14-37-7w4. Viking gas well. TD 2,787 ft.

Amurex-Richfield-Hudson's Bay 1-2 Medin, LSD 2, 32-38-3w5. D2 oil well. TD 8,987 ft.

(Continued on page 225)

THE OIL AND GAS JOURNAL

"Would you rather share a table with drilling, maps, accounting, or pipeline?"

the answer to many of your drilling problems

TRUCO CONCAVE DRILLING BITS

When you're making hole too slow and making trips too often it's time to consult your nearest D & S Field Engineer about Truco Concave Drilling Bits. Trucos do the job faster at less cost per foot.

DRILLING & SERVICE
3031 Elm Street
Dallas 1, Texas

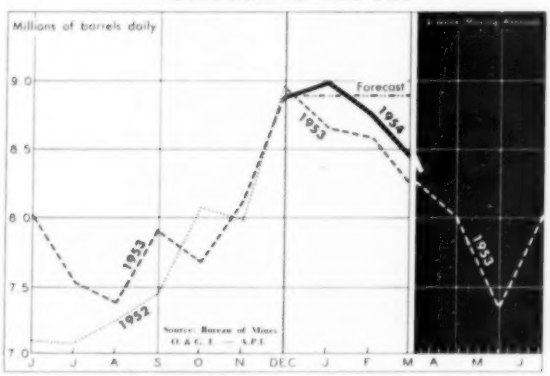
TRUCO DIAMOND BITS AND D & S CORE BARRELS

Latest Figures . . . Industry Trends

A QUICK LOOK AT THE HIGHLIGHTS

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	6,481,400	UP	43,900	DOWN	26,050
Crude stocks	266,942,000	UP	3,044,000	DOWN	8,036,000
Completions	1,061	UP	82	UP	190
Refinery runs	6,761,000	DOWN	239,000	DOWN	204,000
Four-product stocks	300,390,000	DOWN	783,000	UP	21,686,000
Total imports	826,800	DOWN	234,000	DOWN	429,900

TOTAL DEMAND—ALL OILS



The Journal gives you

More Tables and Charts

to meet trend toward increased use of statistical data

THE "Current Statistics" section is larger this week and has a new look. The expansion of this section is the Journal's recognition of the trend toward greater use of industry data by oil operators in every branch of the industry.

Both charts and tables have been added to the section to give more complete coverage and to make it easier to pick out the trends shown by current figures.

Drilling will be covered each week by charts and tables on the second page of the section. Supply items will be on the third page, followed by refining on the fourth and by demand and markets on the fifth. In the second issue of each month, a final page of tables and charts will be added to present some of the material that is available on a monthly basis.

More charts . . . This issue has total of 25 charts in the statistics section. The largest number for any one week in the past was 16. Charts have been added to cover product demands calculated from weekly figures. Trends in refinery output are also shown in chart form. Other new charts cover product imports and world production.

Charts redesigned . . . In the past, all charts on the statistics pages were printed white on black. This method was necessary since there was not enough time to make new charts each week after the data became available.

Since time is still a factor, the current lines on the chart will be cut out of a black background each week. Data for other quarters of the year are shown as black lines.

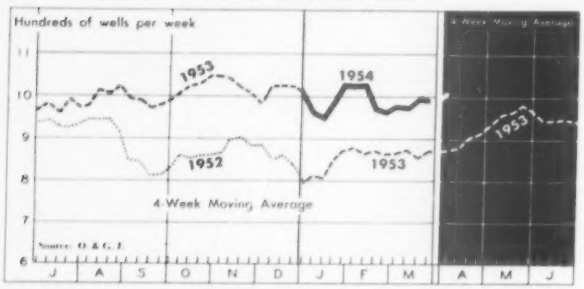
Plottings on the new charts start with figures for June and run through the following June. This method furnishes direct comparisons for a greater number of months of the year.

Statistical charts have their greatest value as indicators of trends. Since trends are the important messages from charts, production and demand data are presented in the new series as 4-week moving averages.

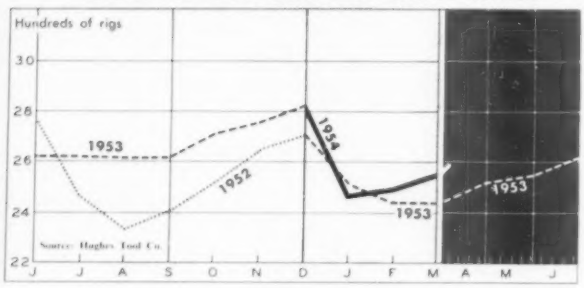
Change in basis . . . Starting with January 1954, the Bureau of Mines is presenting separate statistics on jet fuel. Past data for only the year 1953 have been released by the bureau. Since information is not available for prior years, lines for the last half of 1952 are missing from some of the charts on gasoline and middle distillate. Current figures will exclude jet-fuel components.

Markets . . . Important market changes for the week ended April 7 include a further reduction for natural gasoline, a cut for Mid-Continent bright stocks, and some strengthening of the Gulf Coast gasoline market.

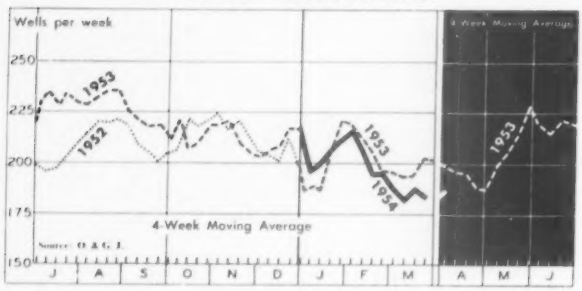
TOTAL COMPLETIONS



ROTARY RIGS OPERATING IN UNITED STATES



WILDCAT COMPLETIONS



ACTIVE ROTARY RIGS

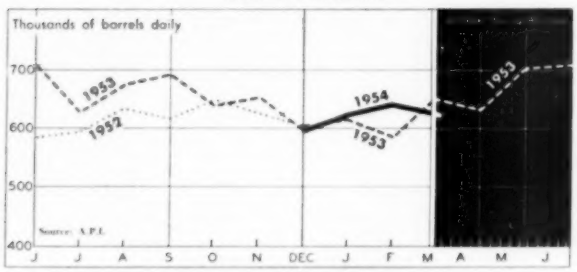
Area—	4-5-54	Change from 3-29-54	Change from 4-6-53
Gulf Coast	546	14	—41
N. and W. Texas-N. Mexico	807	36	2
Ark.-N. La.-E. Tex.	180	3	49
Oklahoma	384	1	47
Kansas-S. Nebraska	166	18	—12
Illinois-Eastern	133	2	33
Rocky Mountain	243	18	43
Pacific Coast	135	—5	—31
Total United States	2,594	87	90
Western Canada	162	15	10

WEEKLY WELL COMPLETIONS . . . WEEK ENDED APRIL 3, 1954

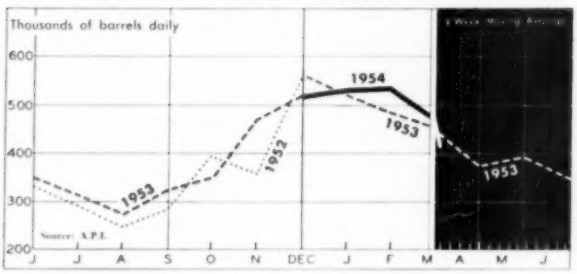
	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1954				
	Comp.	Oil	Gas	Dry	Footage	1954	1953	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Ala.-Ga.-Fla.	2	0	0	2	5,050	32	35	0	0	0	2	2	1	0	1	26	28
Arkansas	12	6	1	5	53,687	184	124	1	0	0	3	4	8	0	0	26	34
California	48	36	0	12	248,310	631	646	1	0	0	12	13	23	0	5	136	164
Colorado	28	13	0	15	167,033	288	124	1	0	0	12	13	10	0	0	110	120
Illinois	53	30	0	23	139,375	643	438	1	0	0	10	11	1	0	0	110	111
Indiana	23	10	0	13	35,796	202	301	0	0	0	3	3	3	0	0	48	51
Kansas	108	56	13	39	355,128	1,134	1,203	3	0	0	14	17	19	0	4	140	163
Kentucky	23	10	4	9	48,078	276	254	1	0	0	3	4	6	0	0	30	36
Louisiana	65	49	3	13	419,689	869	654	0	3	0	4	7	27	17	7	73	125
Northern	30	23	2	5	73,219	449	289	0	0	0	3	3	4	0	1	25	30
Southern	35	26	1	8	346,470	420	365	0	3	0	1	4	24	17	6	48	95
Michigan	16	10	1	5	50,254	160	137	2	0	0	4	6	3	0	0	69	72
Mississippi	8	6	0	2	56,554	94	92	0	0	0	1	1	2	0	0	33	35
Montana	5	3	0	2	26,738	75	100	0	0	0	1	1	1	0	0	22	23
Nebraska	2	0	0	2	10,912	87	71	0	0	0	2	2	6	0	0	25	31
New Mexico	16	8	4	4	105,070	309	353	0	0	0	1	1	6	0	1	39	46
North Dakota	5	4	0	1	36,963	55	66	0	0	0	1	1	3	0	0	13	16
Ohio	21	10	4	‡7	37,608	276	255	0	0	0	0	0	0	0	2	1	3
Oklahoma	169	99	3	‡67	591,958	2,404	1,796	2	0	0	13	15	31	2	7	160	200
Pennsylvania-New York	50	24	3	*23	79,200	622	584	0	0	1	0	1	0	0	2	8	10
Texas	372	248	14	110	1,674,320	4,581	4,264	16	1	3	60	80	187	22	42	1,011	1,262
Southwest (Dist. 1 & 4)	47	25	3	19	217,794	661	697	1	1	1	15	18	15	12	13	180	220
Gulf Coast (Dist. 2 & 3)	46	31	1	14	275,425	733	646	2	0	2	7	11	18	8	13	176	215
Eastern (Dist. 5 & 6)	27	9	7	11	134,755	216	214	0	0	0	7	7	5	0	3	58	66
North Central (Dist. 7-B & 9)	146	93	2	51	465,443	1,692	1,530	7	0	0	20	27	92	2	5	392	491
West (Dist. 7-C & 8)	94	79	0	15	543,202	1,062	955	6	0	0	11	17	57	0	6	189	252
Panhandle (Dist. 10)	12	11	1	0	37,701	217	222	0	0	0	0	0	0	0	2	16	18
Utah	1	1	0	0	610	17	23	1	0	0	0	1	2	0	0	8	10
West Virginia	9	1	4	4	23,016	138	128	0	0	0	1	1	0	0	6	5	11
Wyoming	25	19	0	6	133,673	400	146	0	0	0	3	3	13	0	2	50	65
Miscellaneous	0	0	0	0	0	51	15	0	0	0	0	0	1	0	0	7	8
Total United States	**1,061**	643	54	364	4,299,022	13,528	11,809	29	4	4	150	**187**	354	41	79	2,150	2,624
Total previous week	979	574	54	351	3,865,658			20	2	1	148	171	325	37	75	2,000	2,437
Total April 4, 1953	871	467	70	334	3,445,471			27	1	4	146	178	363	24	96	2,226	2,709

Service wells included: *19, †1, ‡4.

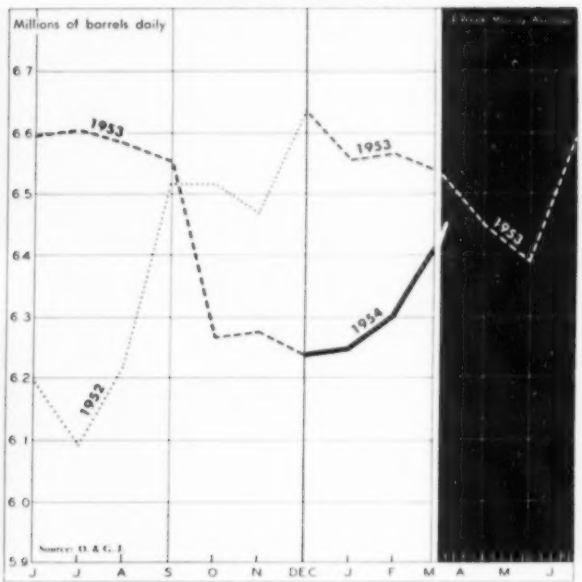
CRUDE IMPORTS



PRODUCT IMPORTS



CRUDE-OIL PRODUCTION

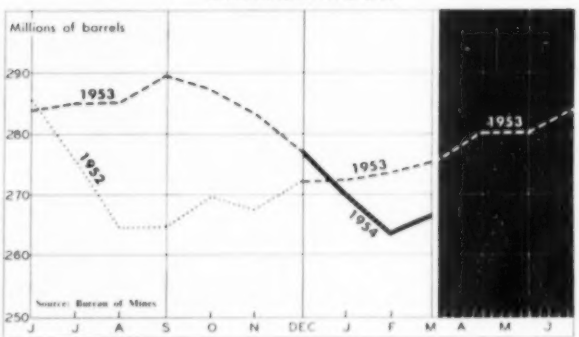


DAILY AVERAGE PRODUCTION FOR WEEK

	April 3			Mar. 27
	Crude oil	Lease condensate	Total	total
Alabama	4,100		4,100	4,300
Arkansas	76,000	600	76,600	76,250
California	991,800		991,800	994,100
Colorado	119,900		119,900	117,700
Eastern	54,500		54,500	54,500
Florida	1,525		1,525	1,475
Illinois	173,800		173,800	172,000
Indiana	30,500		30,500	29,600
Kansas	324,700		324,700	331,200
Kentucky	35,600		35,600	34,200
Louisiana	655,200	47,400	702,600	687,300
North	105,200	3,900	109,100	107,300
South	550,000	43,500	593,500	580,000
Michigan	36,800		36,800	34,700
Mississippi	88,700	4,050	92,750	92,600
Montana	29,600		29,600	30,000
Nebraska	19,400		19,400	19,100
New Mexico	206,175	1,700	207,875	207,375
North Dakota	14,600		14,600	14,600
Oklahoma	515,300		515,300	513,700
Texas	2,760,000	51,250	2,811,250	2,783,000
Dist. 1	42,650	425	43,075	44,075
Dist. 2	145,975	7,500	153,475	152,200
Dist. 3	428,250	24,250	452,500	449,700
Dist. 4	254,900	5,900	260,800	259,900
Dist. 5	47,775	450	48,225	48,050
Dist. 6	117,825	5,800	123,625	123,100
East Texas field	244,900		244,900	242,000
Dist. 7-B	136,950	50	137,000	135,475
Dist. 7-C	179,250	4,750	184,000	180,450
Dist. 8	882,975	1,500	884,475	870,300
Dist. 9	192,850	600	193,450	192,600
Dist. 10	85,700	25	85,725	85,150
Utah	4,900		4,900	4,900
Wyoming	233,300		233,300	234,900
Total U. S.	6,376,400	105,000	6,481,400	6,437,500
Change from previous week, up			43,900	
Canada	201,975		201,975	226,325
Total U. S. production January 1-April 3				591,067,250 bbl.
Same period last year (crude plus cond.)				*608,938,410 bbl.

*Includes 8,730,325 bbl. condensate.

CRUDE-OIL STOCKS



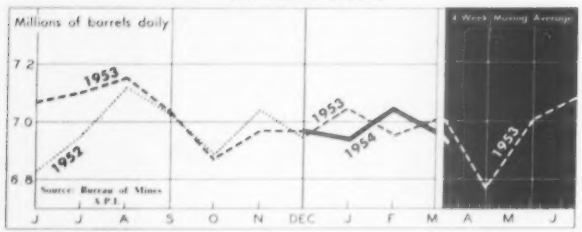
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

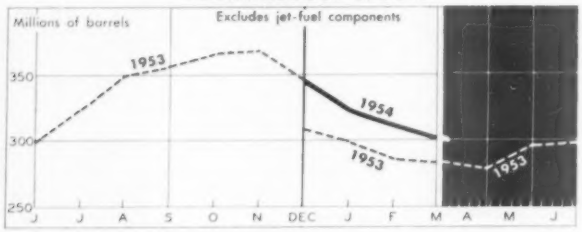
	Mar. 27, '54	Mar. 20, '54	Mar. 28, '53
Pennsylvania Grade	2,770	2,740	2,422
Other Appalachian	1,658	1,775	1,867
Illinois, Indiana, Michigan	12,143	11,827	10,494
Kansas	10,154	10,324	10,511
Oklahoma	26,310	26,331	25,735
Arkansas	3,099	3,050	3,083
Louisiana	14,654	14,675	17,288
North	2,540	2,537	3,164
Gulf	12,114	12,138	14,124
Mississippi	3,336	3,304	3,950
New Mexico	7,517	7,254	7,271
Texas	121,842	120,540	135,346
East Texas proper	10,842	11,187	11,584
West Texas	51,466	51,578	64,764
Texas Gulf	26,027	25,256	25,547
Other Texas	33,507	32,519	33,451
Wyoming	13,800	13,705	13,912
Other Rocky Mountain	3,861	3,215	2,578
California	33,994	34,439	33,520
Foreign	†11,804	10,719	7,001
Total	266,942	263,898	274,978

*Bureau of Mines. †Includes 2,588,000 bbl. in California.

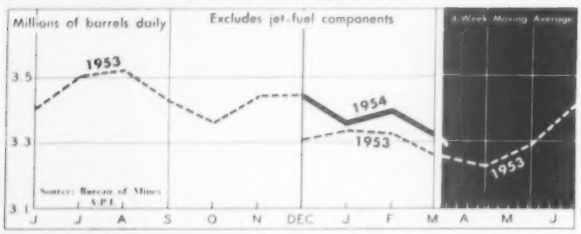
REFINERY RUNS



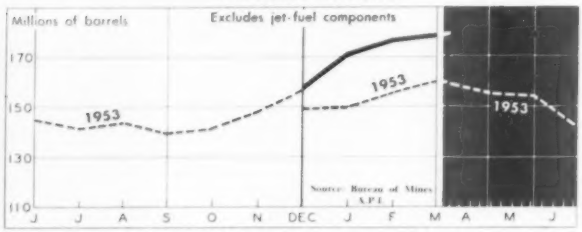
FOUR-PRODUCT STOCKS



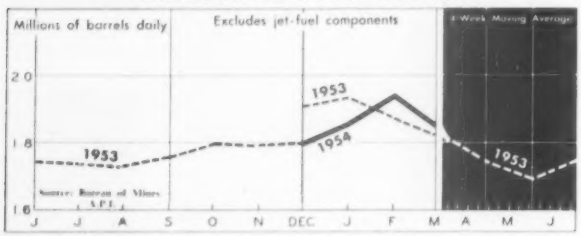
GASOLINE PRODUCTION



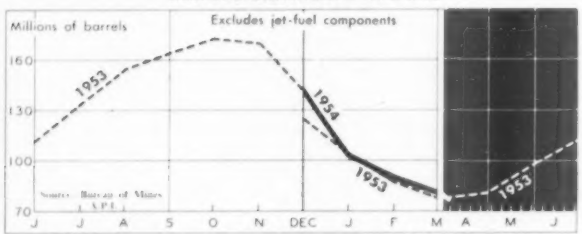
GASOLINE STOCKS



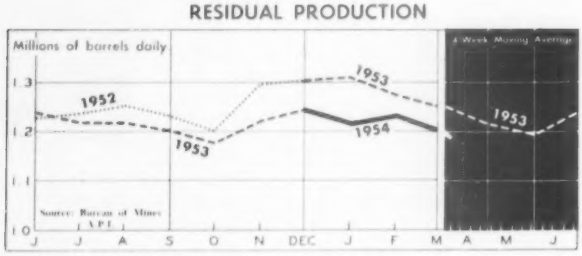
MIDDLE-DISTILLATE PRODUCTION



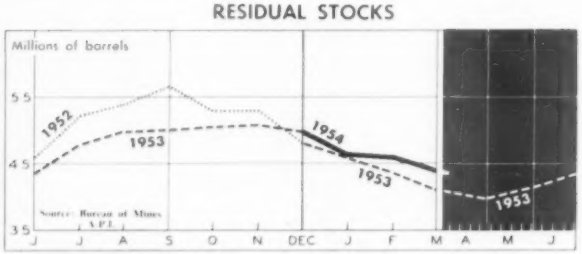
MIDDLE-DISTILLATE STOCKS



RESIDUAL PRODUCTION



RESIDUAL STOCKS



A.P.I. REFINERY REPORT, APRIL 3

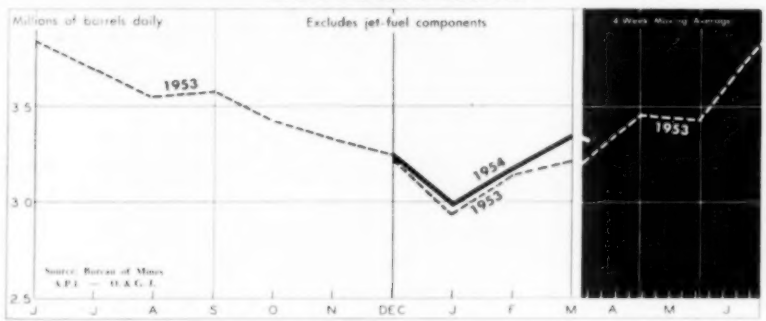
(Excludes all jet-fuel components)

(Thousands of barrels)

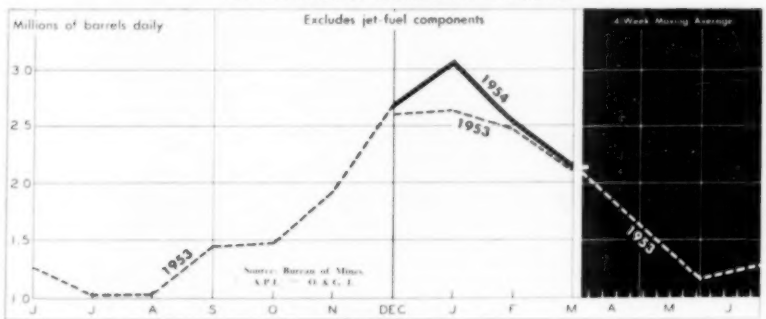
District—	Daily avg. runs	Daily average production: Gaso.*	Kero.	Dist.	Resid.	Stocks‡: Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, April 1953: Daily avg. runs	Daily average production: Gaso.*	Kero.	Dist.	Resid.
East Coast	960	405.1	32.0	274.9	200.7	36,353	7,439	20,111	8,682	997	385.2	44.5	227.6	229.3
Appalachian:														
District 1	108	48.4	5.9	23.4	15.4	4,655	372	842	553	104	41.7	4.7	20.5	14.7
District 2	87	43.3	7.0	16.4	10.9	2,556	295	449	361	80	44.0	4.8	14.3	13.9
Ind., Ill., Ky.	1,253	669.2	76.8	233.0	179.6	40,150	3,495	9,063	4,294	1,149	617.2	65.4	193.2	153.7
Okla., Kans., Mo.	588	349.7	6.9	141.4	40.3	19,394	1,135	6,133	1,223	556	310.6	17.8	121.2	54.5
Inland Texas	259	177.6	11.3	46.6	29.1	7,235	274	984	1,243	259	171.2	12.1	42.5	35.8
Texas Gulf Coast	1,649	729.2	114.4	362.9	248.3	24,109	2,209	5,982	4,829	1,726	793.0	131.3	409.6	248.2
La. Gulf Coast	554	250.4	43.7	125.6	47.6	9,269	1,129	2,875	870	553	267.6	41.0	149.2	55.5
N. La. and Ark.	109	37.4	9.8	24.7	6.1	4,082	506	1,000	103	86	34.1	8.5	20.6	7.1
Rocky Mountain:														
New Mexico	17	10.6		2.9	2.7	188		64	41	21	13.5	0.4	2.7	4.3
Other Rocky Mtn.	203	105.4	2.3	41.4	34.7	8,359	182	1,810	700	207	101.4	2.4	49.1	36.4
California	974	439.1	8.9	143.7	331.0	22,824	411	10,238	20,819	1,043	444.5	7.5	164.0	365.7
Apr. 3, 1954	6,761	3,265.4	319.0	1,436.9	1,146.4	179,674	17,447	59,551	43,718	6,781	3,224.0	340.4	1,414.5	1,219.1
Mar. 27, 1954	7,000	3,372.4	346.3	1,455.0	1,195.9	178,626	17,800	60,654	44,093					
Apr. 4, 1953	6,965	3,147.6	354.1	1,443.1	1,227.6	160,899	18,379	59,428	39,998					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipelines.

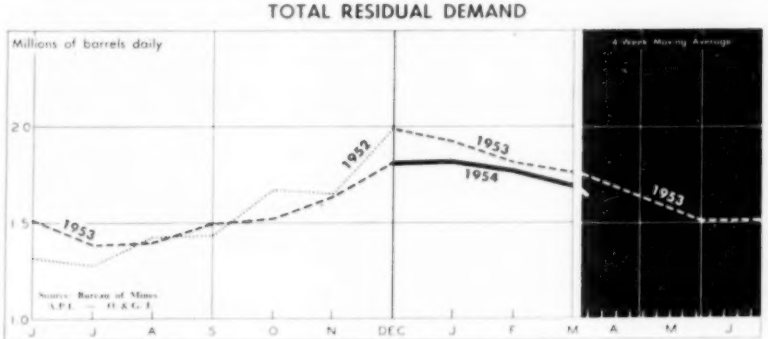
TOTAL GASOLINE DEMAND



TOTAL MIDDLE-DISTILLATE DEMAND



TOTAL RESIDUAL DEMAND



REPRESENTATIVE QUOTATIONS

Spot-market quotations of leading suppliers as of April 7, 1954. Prices are in cents per gallon, except for residual in dollars per barrel and wax in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	10.75-11	11.5-12.25	10.25-10.5
Premium gasoline	11.75-12	13.25-14	11.5-12.25
42-44 w.w. kerosine	9.125-9.375	10.2-10.4	9.25-9.5
No. 2 straw fuel oil	8.25-8.375	9.2-9.4	8.25-8.5
No. 6 residual	$1.20-1.30	$2.20-2.40	$1.85-1.95

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	4.0	3.5	3.75
Grade 18-55	4.8	4.3	4.55

LUBRICATING OILS
Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	18
200 vis., No. 3 neutral, 0-10 pp.	14.25

WAX
Mid-Continent

132-134 A.M.P.	6.0

• Price changes for the week include a reduction of 0.5 cent for Grade 26-70 natural gasoline, a cut of 1.0 cent for Mid-Continent bright stock, and a gain of 0.25 cent by regular gasoline on the Gulf Coast.

PRODUCTION AND DEMAND—MAJOR PRODUCTS

(Thousands of barrels daily)

	Refinery prod.	Total demand
Gasoline:		
Four weeks ended 4-3-54	3,295	3,317
January 1954	3,354	2,985
July 1953	3,501	3,690
March 1953	3,269	3,215
Middle distillate:		
Four weeks ended 4-3-54	1,798	2,175
January 1954	1,857	3,075
July 1953	1,735	1,035
March 1953	1,824	2,119
Residual fuel:		
Four weeks ended 4-3-54	1,184	1,645
January 1954	1,271	1,835
July 1953	1,224	1,390
March 1953	1,256	1,778

SUPPLY AND DEMAND*

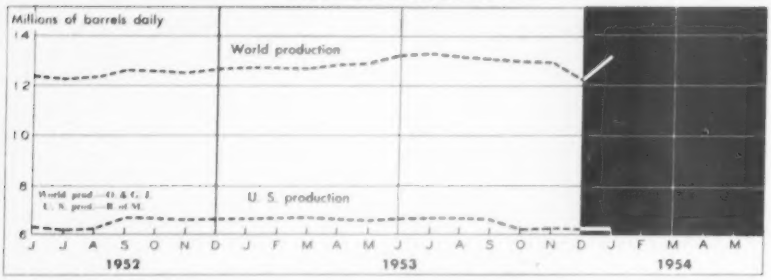
(Thousands of barrels daily)

	January 1954	January 1953
Domestic demand	**8,662**	**8,257**
Gasoline	2,898	2,840
Kerosine	590	541
Distillate	2,413	2,049
Residual	1,778	1,857
Jet fuel	90	69
Lubricants	97	98
L.P.G.	374	371
Other products	391	409
Crude loss	31	23
Exports	**328**	**386**
Gasoline	87	106
Kerosine	15	13
Distillate	57	76
Residual	57	59
Jet fuel		1
Lubricants	33	31
L.P.G.	9	7
Other products	19	22
Crude	51	71
Total demand	**8,990**	**8,643**
Gasoline	2,985	2,946
Kerosine	605	554
Distillate	2,470	2,125
Residual	1,835	1,916
Jet fuel	90	70
Lubricants	130	129
L.P.G.	383	378
Other products	410	431
Crude exp. and loss	82	94
Stock change	**—917**	**—287**
Crude	—189	10
Products	—728	—297
New supply	**8,073**	**8,356**
Imports	**1,143**	**1,135**
Crude	617	616
Products	526	519
Production	**6,930**	**7,221**
Crude	6,241	6,555
Natural gasoline	689	666
Runs to stills	**6,947**	**7,042**

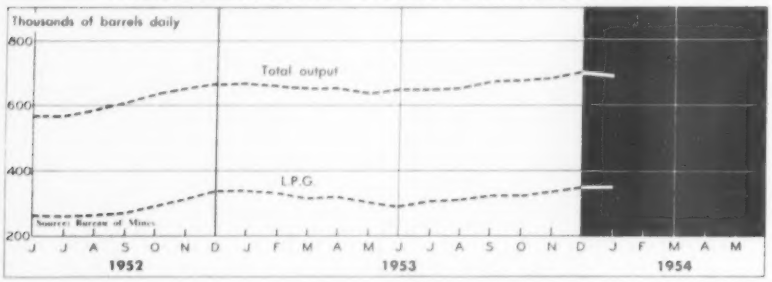
*Bureau of Mines.

(The schedule of selected crude prices appeared on page 188 of April 5 issue and will be printed again next week.)

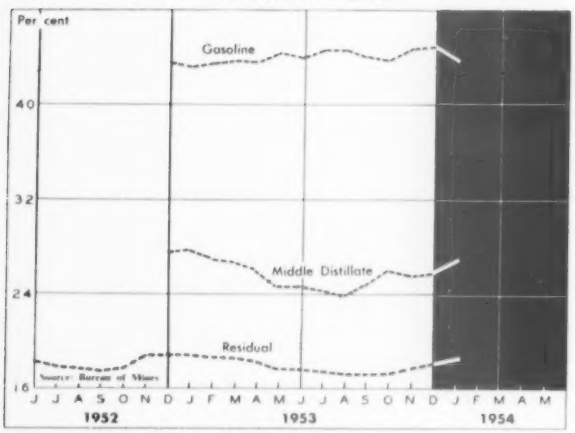
CRUDE-OIL PRODUCTION



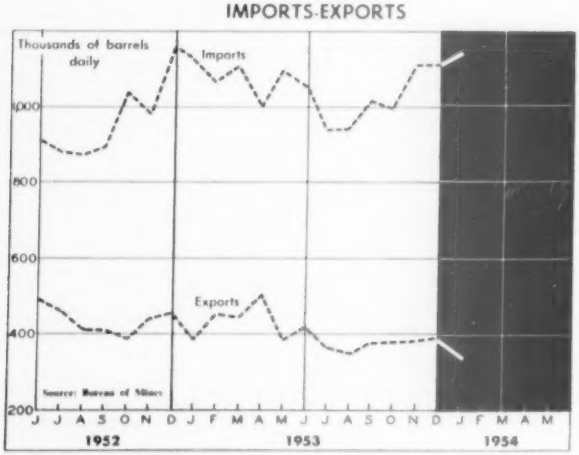
NATURAL-GASOLINE AND CYCLING-PLANT PRODUCTION



REFINERY YIELDS



IMPORTS-EXPORTS



CRUDE PRODUCTION

(Thousands of barrels daily)

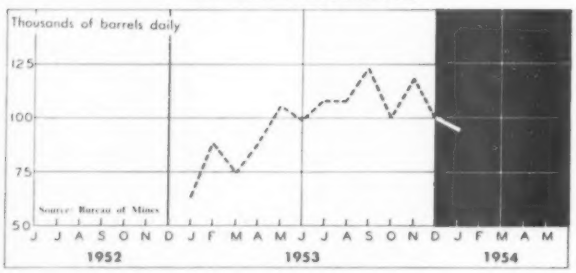
Month—	U. S.	World
January 1954	6,240	13,174
December 1953	6,238	13,241
November 1953	6,277	13,000
October 1953	6,262	13,030
January 1953	6,555	12,883

PRODUCTION AT NATURAL-GASOLINE AND CYCLING PLANTS

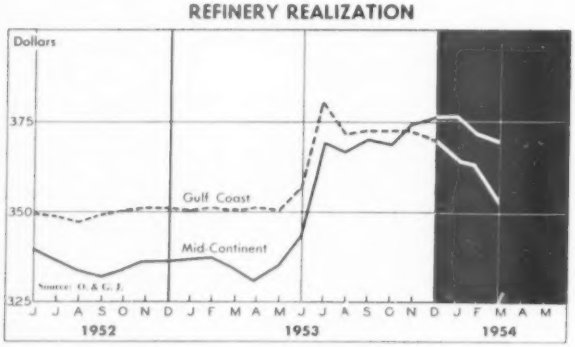
(Thousands of barrels daily)

Month—	L.P.G.	Total
January 1954	355	688
December 1953	348	700
November 1953	330	683
October 1953	321	672
January 1953	324	665

JET-FUEL PRODUCTION



REFINERY REALIZATION



REFINERY REALIZATION

	Mar. 1954	Feb. 1954	Mar. 1953
Mid-Continent	$3.69	$3.72	$3.34
Gulf Coast	3.56	3.63	3.50

Refinery realization is based on yields of major products and average spot prices for regular gasoline, kerosine, No. 2 fuel, and residual as published in The Oil and Gas Journal.

BANKRUPTCY SALE

Commencing April 22, 1954 at 10:00 o'clock A. M. in the Second Division Circuit Court room on the third floor of the Union County Court House in El Dorado, Arkansas.

By Order of the Honorable Edgar E. Bethell, Referee in Bankruptcy of the United States District Court for the Western District of Arkansas, El Dorado Division

The undersigned will sell at public auction all right, title, interest, claim and demand of Donald E. Bradham, as Trustee, in and to all of the assets of the estate of Roberts Petroleum, Inc., Bankrupt, in cause No. 535 now pending in said Court. Such assets will be sold free and clear of all liens and encumbrances excepting only the liens described in paragraph E of said order. The assets are as follows:

1. The oil, gas and mineral leases covering certain lands in Union County, Arkansas, which leases are described on Schedules A, B, C, D, F and G attached to said order.

2. All oil and gas wells located on the lands covered by said leases.

3. All personal property of every kind and description located on the lands covered by said leases or used in connection therewith including all buildings, structures, fixtures, compressors, pumping stations, meter stations, pipe lines, tanks, rigs, casings, engines, pumps and all other machinery, equipment and appurtenances used in connection with or appertaining to the production, supply, transportation, delivery or distribution of oil or gas, which personal property is described on Schedules A, B, C, D, F and G attached to said order.

4. The pulling machines, tools and equipment described on Schedule E attached to said order.

5. The warehouse office furniture and equipment, warehouse stock, yard equipment, machine shop equipment and special items described on Schedule H attached to said order.

6. The several thousand feet of casing, pipe and sucker rods of various sizes described on Schedule I attached to said order.

7. The several automobiles, trucks and tractor and the main office furniture, fixtures and equipment described on Schedule J attached to said order.

8. The machinery and equipment described on Schedule K attached to said order.

9. The choses in action, accounts receivable and claims described on Schedules L and N attached to said order.

10. The books and records described on Schedule M attached to said Order.

All of the terms and conditions of the sale, together with a description of all of the property to be sold are set forth in the order of sale. A copy of the order of sale will be exhibited to all interested parties at the office of Donald E. Bradham, as Trustee, at his address below, during business hours of any business day preceding the date of the sale. Additional information concerning the value of the property may also be obtained upon application to the undersigned auctioneer at his address below.

IMPORTANT: The order of sale provides, among other things, that no person shall be permitted to bid for any of the property described on Schedules A, B, C, D and F attached thereto unless immediately prior to the commencement of the sale the person desiring to bid for such property shall deposit with the auctioneer a cashier's check issued by a bank or trust company and payable to the order of Donald E. Bradham, as Trustee, in the sum of $500.00, and at the same time furnish a statement to the auctioneer setting forth his full name and principal business address. The proceeds of the check of a successful bidder will be credited against his bid, and the checks of unsuccessful bidders will be returned to them promptly after the sale.

F. P. BORDEN, Auctioneer
LeCroy Building
El Dorado, Arkansas
Phone: 3-3638

Donald E. Bradham, Trustee
LeCroy Building
El Dorado, Arkansas
Phone: 3-5444

T. O. Abbott
Attorney for the Trustee
410-412 First National Bank Bldg.
El Dorado, Arkansas

CLASSIFIED —ADVERTISING

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

UNDISPLAYED CLASSIFIED 20c a word one issue. 10% Discount three or more consecutive issues. $4.00 minimum charge. Blind Box in our care nine words. Payable in Advance.

DISPLAY CLASSIFIED
$14.00 a column inch one issue . . .
10% Discount three or more issues.

Address Classified Advertising Material: The Oil and Gas Journal, P. O. Box 1260, Tulsa 1, Okla.

EQUIPMENT FOR SALE

FOR SALE: ENGINE—165 Hp. Climax T-61 on Skid. Herndon Drilling Company, 421 Mayo Building, Tulsa, Phone 4-9700.

DRILLING equipment. New and used spudders, rotaries, tools. Everything for well drilling. Fishing tools rented. Pressey & Son, Pueblo, Colorado.

PIPE. New seamless J55 mill end 5½" and 7" from Pueblo mill. Get our low prices. Pressey & Son, Pueblo, Colorado.

SUPER ELECTRONIC MAGNETOMETER. Designed with high gain amplification for finding low magnetic highs or anomalies which have been undetectable in the past. One man can make a complete geophysical survey. Write for details. Super Electronic Scope Co., Rt. 11, Box 449, Fort Worth, Texas.

83 STAR SPUDDER with tools from 13" down to 5". Winch truck and all small tools. Reason for selling: illness. H. C. Full, RR #1, Box 249, Terre Haute, Indiana. Phone: CRawford 63013.

SEVERAL FAILING MODEL 1500 rigs, various ages, conditions and inventories. P. O. Box 643, Billings, Montana.

FOR SALE: Waukesha G.A.K. 145 H.P., like new, Twin Disc clutch, 12" V Shive. $1650.00. Box 583, Ardmore, Okla. Phone 4726.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

FOR SALE: 5½" x 20" Class "Y" Cooper Compressor Cylinders, 90 hp. Superior Compressor skid mounted, 4"—500 lbs. gate valves, electric driven centrifugal water pumps. Alfred B. Kern, 227 Wright Building, Tulsa 3, Oklahoma.

SACRIFICE

8 NEW
Westinghouse VHS Motors
100 hp. explosion-proof

Nationally known manufacturer purchased these motors for a project which was cancelled. For attractive price and full data, write

Box G-992
The Oil and Gas Journal
Tulsa, Oklahoma

EQUIPMENT FOR SALE

FOR SALE—COMPRESSOR UNIT: Wilson Supply-Ingersoll-Rand, Type ES-1 LeRoi Engine Belt Driven Two Stage, Portable "Packaged" Compressor, Prime Mover, LeRoi Model H-2000—Intake Pressure, 20 PSIG; Discharge Pressure, 700 PSIG; Capacity 735,000 CFD. All above Skid Mounted, complete with Cooling Tower. Located Approximately 35 miles SE of Midland, Texas, in Spraberry Area, Used Approximately 30 Days. Please contact Sohio Petroleum Company, J. R. Williams, Jr., 1300 Skirvin Tower, Oklahoma City, Oklahoma. Phone RE 9-0511 for additional information.

SHRIVER 42" x 42" cast iron Filter Presses, Plate & Frame Type; 15—Sperry 18" x 18" cast iron Filter Presses, 11 chambers; #12 Sweetland Filters. Immediate shipment. Attractively priced. Consolidated Products Co., Inc., 150 Observer Highway, Hoboken, N. J. N.Y. Tel. BArclay 7-0600.

THREE #12 Sweetland Filters, 48 bronze leaves, monel covered, on 3" C.C.; 2 unused, 1 slightly used. 11—Sperry 18" x 18" cast iron Filter Presses, 11 chambers. Consolidated Products Co., Inc., #65 Garden Street, Hoboken, N. J. N.Y. Tel.: BArclay 7-0600.

FOR SALE: Two 18-trace sets of Reflection Seismograph instruments, Rack and Panel mounted. One set mounted in instrument cab, on 1951 GMC Truck, model 301-24. Very reasonably priced. Texas Seismograph Co. Box 2069. Phone 3-1493. Wichita Falls, Texas.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

FOR SALE

New lubricated plug cocks at interesting prices.

(13)—	½"	Nordco series	1500 #3044
(24)—	¾"	" " " "	1500 #3044
(7)—	1"	" " " "	1500 #3044
(8)—	1½"	" " " "	1500 #3044
(7)—	4"	" " " "	150 #1945-RJ
(2)—	4"	" " " "	400 #2145-RJ
(2)—	4"	" " " "	600 #2249-RF
(2)—	4"	" " " "	900 #2345ME3-RF
(1)—	8"	" " " "	300 #4285-RF
(3)—	8"	" " " "	150 #1985RF
(2)—	1"	" " " "	1500 #3045RJ*

*(W/rings, bolts & weld flanges.)

HENZE VALVE CO.
McCandless St., Linden, N. J.

EQUIPMENT FOR SALE

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

FAILING model heavy duty 1500 drill and water truck. Write to Box 819, Longmont, Colorado, for details.

MODEL H CARDWELL Servicing Unit. Truck mounted with mast. Fully equipped. Box No. 1 or Phone 153, Canton, Kansas.

REED WIRE Line Core Barrel complete with accessories for use with 4½" drill pipe. Practically new, $1,000.00. Carbons Consolidated, Inc., P. O. Box 2927, Monroe, Louisiana.

FOR SALE: Cardwell RL double-drum spudder complete with tools, now working in Oklahoma, also Hydraulic casing pulling machine complete with tools. Phone ME 7-2242, Oklahoma City, Oklahoma.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

FULL FACTS, 8" x 10" PHOTOS AIRMAILED ON REQUEST, CALL LOUISVILLE—WABASH 6803

EQUIPMENT BUYS

D7 TRACTOR DOZER—CATERPILLAR DIESEL, Ser. #5T5878, equipped with LeTourneau straight dozer and LeTourneau DDPCU. The Diesel engine starts easy and runs good and the track group has had a new set of rails installed and the carrier rollers built up with hard weld. This machine is very serviceable and presents an outstanding value for an economical buyer.
f.o.b. Ashland, Ky. $5,950.00

DW10 TRACTOR-SCRAPER—CATERPILLAR, Ser. #1V2504, equipped with "Cat" #15 Scraper. The drive tires are 21.00x25 Traction type and the front tires are 12.00x20. All rubber on tractor and scraper is approximately 90% good. This machine has had very limited use on one job and performs just like new.
f.o.b. Louisville, Ky. $21,500.00

CLAM DRAG, CRANE COMBINATION—LORAIN L50K, Ser. #22846, powered by Caterpillar D318 Engine. A 1 yd. machine mounted on 14' crawlers. Has 40' boom, complete crane, clam and drag attachments. Current hourmeter reading 563 hours. Looks and runs like new. Has seen only 60 days service.
f.o.b. Paducah, Ky. $21,500.00

WHAYNE SUPPLY CO.

800 W. MAIN ST.—LOUISVILLE, KY.
ASHLAND, KY. • BOWLING GREEN, KY.
PADUCAH, KY. • EVANSVILLE, IND.

80,000 BBL. WIGGINS PONTOON FLOATING ROOF TANK

A.P.I. Chicago Bridge all welded 5 ring 120' x 40' located Brownstown, Ill. Price $17,500 as is or cut down match-marked, loaded on car $22,500.

Phone 3-6141 **W. C. Berry** **P. O. Box 1858** **Tulsa**

EQUIPMENT WANTED

WANTED IMMEDIATELY: Ductility machine, penetrometer, and other asphalt lab equipment. Box H-122, The Oil and Gas Journal, Tulsa, Oklahoma.

250,000 FT. 8⅝ o.d. pipe with collar and plain end. $1.00 per foot Oklahoma. Rogers & Lundquist, 620 Wright Building, Tulsa, Okla. Phone 3-2072—5-8850.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale. Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

HELP WANTED

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

OIL INDUSTRY Employment Service, Tom Robinson, owner, 405 Tuloma Bldg., Tulsa, Oklahoma. For technical and trained oil industry personnel. Write for blank.

PHOTOGEOLOGIST—To head photogeolic interpretation section. Must be College graduate—5 years experience—mining experience desirable. Write giving age, education and full details of experience. All replies confidential. Box G-968, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST—Large Gulf Coast independent needs Petroleum Geologist as representative in Oklahoma. Ten years Oklahoma experience required. Reply giving full particulars. Box H-145, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER, Civil or mechanical, must have construction experience and be qualified to get a big job done with precision. People of less ability should not apply. 907 Sharp Building, Kansas City, Mo. VIctor 8533.

SALES REPRESENTATIVE
For engineers and constructors to the petroleum and chemical industries. Eastern location. Desire chemical engineer with real record of accomplishment in this field to whom we can offer a distinct opportunity. All replies will be treated in full confidence. Our employees know of this advertisement. Box H-137, The Oil and Gas Journal, Tulsa, Oklahoma.

MANUFACTURERS AGENTS calling on oil producers to represent plastic pipe manufacturer. Must have experience in selling to the oil industry. Reply stating present lines and territory now covered. Confidential. Box H-138, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM OR RESERVOIR ENGINEER

With minimum 3 years' experience in development, production and oil and gas reservoir engineering on primary and secondary recovery problems. For New York office of major foreign producer. Write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OGJ-7

Arabian American Oil Company

505 Park Avenue
New York 22, N. Y.

HELP WANTED

PARTY CHIEFS, Computers, Observers, Engineers, and Shooters by Major Oil Company. Parties will be located in Texas. Give educational background and experience in letter. Reply to Box H-129, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Manufacturer's representative now calling on supply stores to represent old established manufacturer of sub surface pumping and production equipment. Several open territories. Box H-144, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

PETROLEUM OR RESERVOIR ENGINEER

For New York office of major foreign producer. Proficient in mathematics with 4 or more years' extensive experience in oil and gas reservoir engineering on primary and secondary recovery problems. Duties will include preparations of basic field production and reservoir data for application in analogue and digital computors, performance of analytical analysis of field behavior and interpretation and preparation of resulting data for reservoir engineering reports on specific fields.

Write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OG-1

Arabian American Oil Company

505 Park Avenue
New York 22, N. Y.

SALES ENGINEER

Position as Sales Engineer for large valve and pipe fitting manufacturer, age 23-34. B.S. Degree in Engineering or equivalent essential.

Must be free to travel and to relocate following a reasonable period of factory training.

Box H-135
The Oil and Gas Journal
Tulsa, Oklahoma

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. [illegible] No. 3-3141, Hobbs, New Mexico.

PETROLEUM ENGINEER, Age 32, competent, aggressive; experienced in production, drilling, reservoir analysis, proration. Desires responsible position in Rocky Mountain Area. Box H-131, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED GRADUATE PETROLEUM ENGINEER desires responsible position with aggressive independent or individual in Rocky Mountain region. Box H-127, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

SECONDARY RECOVERY: Penn State Petroleum Engineering graduate; 21 years thorough experience, all phases field and engineering work. Thos. O. Glenn, 221 North Perry St., Titusville, Pa.

REFINERY EQUIPMENT Inspector, Thermal, Catalytic, Platforming. Varied Refining Experience. Box H-124, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION INDEPENDENT PRODUCERS: Has the gas-natural gasoline aspect of your business grown big enough to need expert attention? Registered chemical engineer, 42, presently gasoline plant superintendent, has the technical and business sense to do the job. Box H-125, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST - GEOPHYSICIST. Fourteen years experience. Seven years seismic supervisor Gulf Coast, Rocky Mountain Division and Canada. Desires position as coordinator, geologist-geophysicist, or manager uranium exploration with oil or mining company. Now residing Denver. Prefer Rocky Mountain Area. Box H-143, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY ENGINEER: Qualified to fill position of assistant manager, chief plant engineer, or assistant chief plant engineer depending on magnitude of facilities. Have been in executive plant engineering capacity as a consultant and with a large refinery and aircraft plant past eight years. Experience includes planning, design, estimating, field and cost control of minor and major projects ($10,000,000 was largest project handled); planning of maintenance and preventive maintenance work including major plant shutdowns; organization and cost control; and plant dismantling or replacement. Box H-142, The Oil and Gas Journal, Tulsa, Oklahoma.

GAS FIELD SUPERINTENDENT—25 years cable tool experience in Appalachian area. Now employed, will travel. Box H-141, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN-LAWYER desires to relocate in Rocky Mountain Area. Presently with major oil company. Member state bar. Young. Married. Box H-140, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST: Nine years seismograph experience Latin America States; Age 38; Consider Foreign. Box H-139, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED GEOLOGIST 15 YEARS. Five years and 10 field seasons Rocky Mountains. Background: University professor; major oil company research; well site, surface, subsurface, reservoir, administration and public relations. Formerly division geologist for independent. Age 37. Salary or retainer. Write: Turner, 2121 So. Holly, Denver.

ENGINEER: B.S. and M.S. degrees. 6 years varied experience in petroleum development, production and reservoir engineering. Desires position in Texas-Louisiana area. Will consider other areas, including foreign. Box H-136, The Oil and Gas Journal, Tulsa, Oklahoma.

EXECUTIVE MANAGER fair-sized independent producer wishes to improve salary and participation. Engineering degree, fifteen years experience both major and independent. Capable of supervising all departments. Excellent experience drilling, completion, producing, trading deals, negotiating contracts, etc. Opportunities in present company limited. P. O. Box 11,264, Berry Street Station, Fort Worth, Texas.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column. Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

ELECTRICAL CONTRACTORS

Office Phone 5-5315 — Res. Phone 7-4950

W. L. RATCLIFF COMPANY
ELECTRICAL CONTRACTORS
Industrial—Commercial—Distribution

W. L. Ratcliff, P. O. Box 373 — 506 Caddo St., Shreveport, La.

ROYALTIES

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

LEASE AND DRILLING BLOCKS

200 ACRES, Drilling well. Offset section originally 600 bbl. and 12 M gas. Lower Dutcher. Pipe line, high gravity oil. 1-32—$200.00, 1-16—$375, ⅛—$725.00, ¼—$1,400.00. Money escrowed. L. Price, Coweta, Okla.

LEASES FOR SALE or DEAL—240 acres section 30-1-26, Decatur County, Kansas. 640 acres section 31-22-18, Pawnee County, Kansas. Box 527, Chappell, Neb.

160 OIL LEASE Farnam Dome, Utah, near new gas well. Bargain. R. O. Barnsley, 950 Lincoln Ave. Palo Alto, California.

320 ACRE PRODUCING OIL LEASE, Kansas, recent well, 1000 acres offset leases, Hunton and Viola production. R. D. Swan, Daniel Building, Tulsa.

FOR SALE: 763 acre one fee owner oil lease near Center, Shelby County, Texas. In the play joins Humble, Gulf, Sun acreage, four dollars per acre, several smaller tracts same area five dollars acre. We only solicit buyers who know the oil business. W. H. Liem, Box 287, Center, Texas.

FOUR PRODUCING, paying leases for sale, old production. Will react to secondary recovery methods. H. A. Miller, Glasgow, Kentucky.

WILL pay cash instantly for lease (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

80,000 ACRES: Mineral timber land, Tennessee—$3.50 per acre, all mineral rights. Details—E. Jester, 12744 Vanowen, North Hollywood, California.

TWENTY-FIVE THOUSAND FIVE HUNDRED ACRES drilling block, located on excellent gravity meter surveyed high South Georgia. Can furnish copy of survey. No well ever drilled on structure. Oil and gas seepages. Tuscaloosa and Eutaw formations exist in this section of Georgia. Will sell entire block account of illness, fifty cents per acre. No rental due for two years, ⅛ royalty landowner, ten year leases, 10c per acre. Good prospect for test well. Geology available to interested parties. T. R. Davis, 406 E. 6th Street, Vidalia, Georgia, Phone 3639.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

OVER $5,000,000.00 OIL PRODUCING PROPERTIES FOR SALE

Located in Texas and Oklahoma. Information furnished to qualified buyers only.

COMBEST ROYALTY COMPANY
Amarillo, Texas

INDICATED FIELD SE NEW MEX.

Well to drill next to S.I. well which showed for prod. 2 zones Permian. Some 1/100th interests in well & blk. at attractive price. Data on request.

W. J. PETERMAN, GEOLOGIST
1919-1954
Portales **New Mexico**

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

BUSINESS OPPORTUNITIES

WANTED: Good late model Spudder or Rotary Drilling Rig, on Working-Interest basis. Depth 2,500 to 3,000 feet. Can keep Rig working. Give full details in first letter. Box H-133, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL FIELD Supply and Service Companies . . . get new customers . . . keep old customers. Here's how . . . mail Nutville News, 4 page house organ to your regular and prospective customers. Builds good will. Free sample and plan. Write today. Ad-Creators, Box 1313, Hutchinson, Kansas.

REAL ESTATE

20 SECTIONS OWNED, 10 sections leased, Southeastern Colorado. Good improvements, not leased for oil, 24 inches snow, exchange for farm land or producing royalties. Ranch is clear. Price $280,000.00, give or take difference, immediate delivery. S. K. Roach, Groom, Texas. Phone 3721.

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

SERVICES

QUICK SERVICE PIPE DRILLER

Specialize in drilling out any size tubing, drill or line pipe plugged with cement, sand corrosion or paraffin. Drill and clean any size underground salt water lines. Operate in Texas and adjoining states. Call collect day or night: ME-2338. W. H. Anderson—1010 E. Cross Timbers, Houston 22, Texas.

WANTED

WANTED: STRIPPER PRODUCTION, Bartlesville sand, for water flood. Southeastern Kansas. Please give full information. Box G-996, The Oil and Gas Journal, Tulsa, Oklahoma.

FIRE FIGHTING SERVICE

OIL WELL FIRE FIGHTER—THE BEST
Specially Trained Under the Late Tex Thornton
TED E. FERRIN and O. E. "CHOCK" BROOME
Phone 1392-JI or 1044-W-1, P. O. Box 642
Drumright, Oklahoma
Work in Any Field in the World

EQUIPMENT MEN

Wilcock is Sales Manager Oliver Berry Division

J. W. WILCOCK

The appointment of James W. Wilcock as general sales manager of the Berry Division, Oliver Iron & Steel Corp., has been announced by Ara A. Cambere, vice president, sales. The Berry Division manufactures a complete line of hydraulic motors at its plant located in Corinth, Miss.

Wilcock is a graduate of University of Michigan and Ohio Wesleyan University.

Yale Names Sloan, Parsons To Pump Sales Management

J. K. SLOAN

As a primary step in expanding the sales and service program of Yale Tri-rotor pumps, two major administrative appointments have been announced by James D. Young, general sales manager of the lock and hardware division of The Yale & Towne Manufacturing Co.

J. Kenneth Sloan has been named manager of pump sales for the division, and Joseph E. Parsons has been appointed assistant to the manager of pump sales. Under the direction of Sloan, the entire selling setup of Yale pumps will be reorganized with the object of increasing sales distribution and service facilities.

Sloan had been a member of the sales organization of George D. Roper Corp. for 8 years prior to his present appointment. He will make his headquarters in Stamford, Conn.

Parsons, who will assist Sloan in pump sales and service expansion planning, has been with the company for the past 7 years. He has had experience in both production and sales, and until his latest promotion served as supervisor of pump sales.

Moorman Joins Nalco In Technical Sales Capacity

Joseph W. Moorman, formerly with M. W. Kellogg Co., and more recently a consulting engineer, has joined the catalyst division of National Aluminate Corp. in a technical sales capacity.

Moorman has been active in the cracking catalyst field since its inception both from a design and operational standpoint. He was associated with Kellogg during the development of the fluid cracking catalyst process.

As a consultant, Moorman specialized in catalytic cracking processes and in the application of both fluidized and moving-bed techniques to petrochemical processing.

He will represent Nalco's catalyst division primarily in the Mid-Continent and Gulf Coast areas, and will be avail-

able, when needed, to assist in analyzing Nalcat catalyst performance in commercial units.

Garrett Oil Tools Names New Vice Presidents

WHITTENBERG

H. L. BROWN

D. E. Whittenberg, of Houston, and Harold L. Brown, of Dallas, have been elected vice presidents of Garrett Oil Tools, Inc., Longview, Tex., and have also been appointed managers of sales in two recently created company sales regions. Whittenberg, formerly manager of the company's Southwest Texas division, was placed in charge of the southern region encompassing the territories from New Orleans to the Rio Grande River in Texas. Brown is manager of the northern region, which includes East Texas, North Texas, West Texas, North Louisiana, Arkansas, and Oklahoma. He was formerly manager of the East Texas and West Texas divisions.

B. F. KRAUSE

V. B. SCOTT

B. F. Krause, former manager of the Texas Gulf Coast division, was made manager of the company's export division, and also placed in charge of the areas where Garrett products are distributed through independent sales engineers. Krause will also serve as technical coordinator between the sales and engineering departments.

Vernon B. Scott, formerly manager of the distributing agency for Garrett relief valves, was named manager of the relief valve division of the company.

In making the announcements, H. U. Garrett, president, said that they were part of a broad company policy aimed at closer coordination between manufacturer and ultimate consumer. A new executive sales office and warehouse, now under construction in Houston, is also included in this program.

ADVERTISERS IN THIS ISSUE

Adams Pipe Repair Products 192
Aerotec Corporation, The 40
Allis-Chalmers Mfg. Co. 28, 29, 59
Alten Foundry & Machine Works Inc. 82
American Car and Foundry Company 65
American Iron & Machine Works Co. 213
American Locomotive Company 38, 39
American Recording Chart Co. 150
Anchor Petroleum Company 90
Anglo-Iranian Oil Company, Ltd. 138
Automotive and Aircraft Division American Chain & Cable 202
Axelson Manufacturing Company 15
Baash-Ross Tool Company 83
B and W Incorporated 189
Baird Mfg. Co. 204
Baker Oil Tools, Inc. 88
Bank of New York, The 10
Bank of Toronto, The 151
Baroid Sales Division, National Lead Company 71, 72
Beaird Company, Inc., The J. B. 19, 20
Beaumont Iron Works, A Subsidiary of American Locomotive Co. 203
Bethlehem Steel Co. 110
Black, Sivalls & Bryson, Inc. 75
Bos-co Equip't Eng'r'g & Mfg. 184
Bruning Company, Inc., Charles 205
Bullard Company, E. D. 172
Butler Manufacturing Co. 166
Byron Jackson Co. Front Cover
Cameron Iron Works, Inc. 124
Carbide and Carbon Chemicals Company, A Division of Union Carbide and Carbon Corporation 13
Cardinal Chemical, Inc. 74
Caterpillar Tractor Co. 6
Chevrolet Motor Div., General Motors Corp. 48
Chicago Bridge & Iron Company Inside Front Cover
Clark Equipment Company, Construction Machinery Division 37
Classified Advertising 221, 222, 223, 224
Cleveland Trencher Company, The 160
Collins Radio Company 17
Cooper-Bessemer Corp., The 109
Cooper, Inc., Fred E. 79
Crose Manufacturing Co., Inc., M. J. 178
Crossley-Premier Engines, Ltd. 164
Darling Valve and Mfg. Co. 31
Dean Brothers Pumps, Inc. 164
Delta Engineering Sales Co. 185
Dixie Carriers, Inc. 204
Dore', Co., John L. 192
Dow Chemical Company, The 190
Dowell Incorporated 201
Dresser Industries, Inc. 174, 175
Dresser Manufacturing Division 42
Drilling & Service, Inc. 214
du Pont 53, 54
Eastman Chemical Products, Inc. 207
Edward Valves, Inc. 188
E-I-M Company, Incorporated 64
Farrel-Birmingham Co., Inc. 183
Fleet-Line Co. 185
Flint Steel Corporation 170
Fluid Packed Pump Company 155, 156
Gaso Pump & Burner Mfg. Co. 55
General Electric Company 23, 46, 47
General Electric Co., Electronic Dept. 35
Goodall Rubber Company 176
Goodrich Company, B. F. 3
Grancell, I. H. 188
Grove Regulator Co. 11
Guiberson Corporation 80
Halliburton Oil Wells Cementing Co. 7, 52
Houston Contracting Company 192
Hughes Tool Co. Back Cover
Inferno Co., The 189, 204
Insley Manufacturing Corporation 182
Jenkins Bros. 49
Johns-Manville Corporation 60
Johnston Pump Company 81
Johnston Testers, Inc. 21, 68
Jones & Laughlin Steel Corporation Supply Division 66
Jones Company, The S. M. 85
Kaiser Steel Corporation 50
Keasbey & Mattison Company 45
Kewanee-Ross Corporation 22
Kinzbach Tool Co., Inc. 212
Klinger Limited, Richard 129
Koppers Company, Inc. 69
Lane-Wells Company 44, 67
Larkin Packer Company, Inc. 76, 77
Layne & Bowler, Inc. 16
Macco Oil Tool Co. 181
Mack Trucks, Inc. 62, 63
Magnet Cove Barium Corp. 173
McDonald Company, B. F. 169
McKee & Co., Arthur G. 58
Midwest Piping Company, Inc. 41
Moore Corporation, Lee C. 135
National Airoil Burner Co., The 184
National Tank Company 226
Nordberg Mfg. Co. 112
Norris Manufacturer, Inc., W. C. 86
Oil and Gas Journal, The 162, 191, 211
Oil Base Inc. 187
Oil Well Supply Co. 4
Okadee Company 206
OPW Corporation 12
Orbit Valve Company 158
Otis Pressure Control, Inc. 190
Pacific Coast Borax Co. 152
Page Fence Association 170
Parkersburg Rig & Reel Co. 143
Peerless Supply Co., Inc. 185
Penn Controls, Inc. 136
Petroleum Electric Power Assn. 57
Petroleum Equipment Suppliers Assn. 32, 33
Ramsey Company, Inc., Stan 212
Ratigan, Inc., J. P. 193
Raybestos-Manhattan, Inc., Packing Div. 56
Rector Well Equipment Co., Inc. 84, 189
Reda Pump Company 160
Reed Roller Bit Company 209, 210
Republic National Bank of Dallas 24
Republic Steel Corporation 30
Republic Supply Company 194
Roberts Petroleum Inc. 221
Rockwood Sprinkler Company 27, 51
Sanborn's International Airport 181
Schlumberger Well Surveying Corp. 137
Second National Bank of Houston 5
Shaffer Tool Works 133
Smith Corporation, A. O. 61
Smith & Son, Inc., Ray L. 193
Socony-Vacuum Oil Co., Inc. 34
Southern Mill & Mfg. Co. 36
Steel Forgings, Inc. 185
Stewart & Stevenson Services, Inc. 2
Texas Employers Insurance Association 9
Thermix Corporation, The 40
Timken Roller Bearing Company 25
Tretolite Company 70
Tulsa Crating Co. 164
Ultra Violet Products, Inc. 181
Union Carbide and Carbon Corporation, Carbide and Carbon Chemicals Company 13
United States National Bank of Denver 149
United States Rubber Company 18
U. S. Steel Corp. Subsidiaries 4
United States Treasury Dept. 8
Visco Products Co., Inc. 107
Vogt Machine Co., Henry 14
Wagner Electric Corporation 26
Warner Lewis Company 193
Waukesha Motor Company 43
Well Equipment Mfg. Corp. 78
Wheatley Pumps & Valves, Frank 171
Wilson Manufacturing Co., Inc. 73
Wood's Sons Co., T. B. 204
Youngstown Sheet and Tube Company Inside Back Cover

WILDCAT COMPLETIONS

(Continued from page 214)

Union 6-29 Irvine, LSD 6, 29-11-2w4. Dry. TD 3,614 ft.

Pathfinder-Poplar-Admiral 1 Kessler, LSD 14, 10-38-7w4. Dry. TD 2,603 ft.

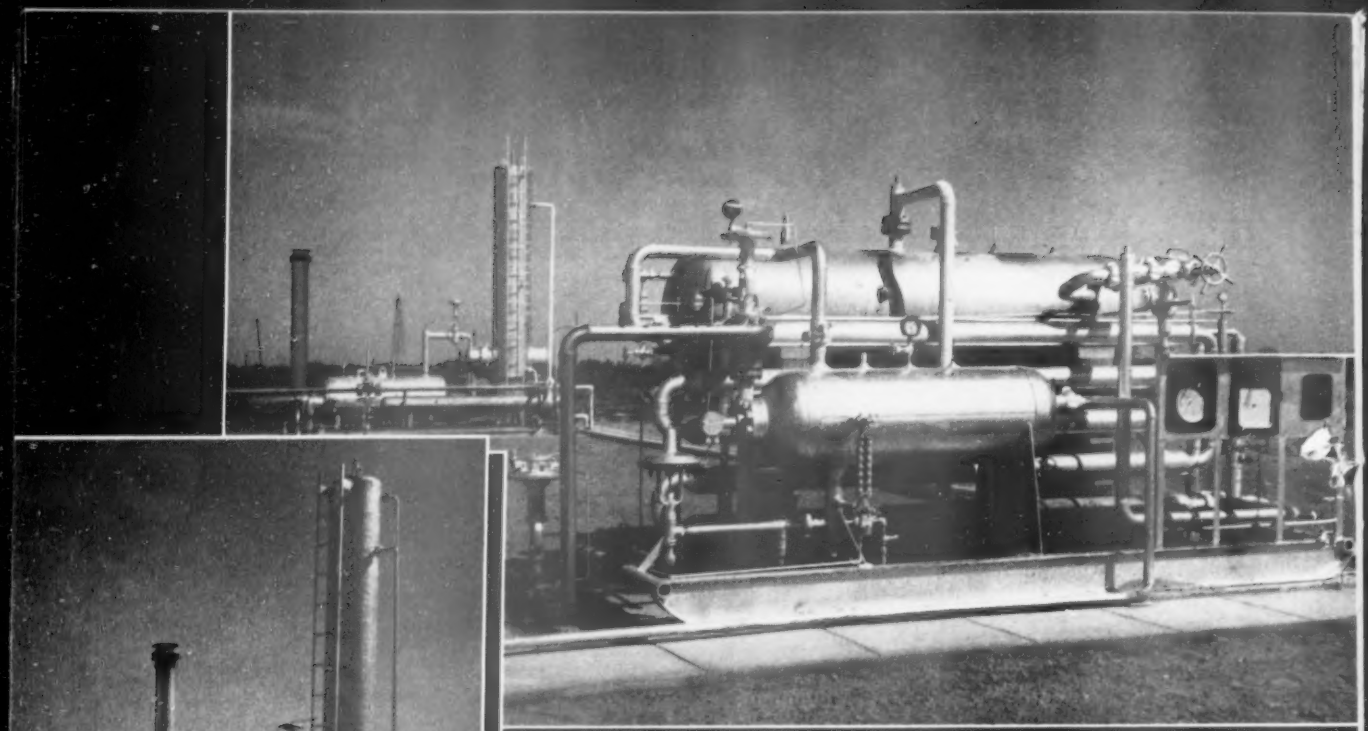
Southern Production A7-1 Atlantic, LSD 4, 16-78-5w3. Dry. TD 4,205 ft.

British American et al 1 Piyami, LSD 10, 35-10-22w4. Dry. TD 4,677 ft.

Mid Western 7-16 Speddin, LSD 7, 16-59-12w4. Dry. TD 2,250 ft.

BRITISH COLUMBIA

Bekami Lake 1 (B. C. Oil Lands, Ltd.), 59° 30' 10" N. Lat., 123° 6' 7" W. Long., TD 3,750 ft. Suspended.



A 15 MMCFD, 1000# W.P. LTX UNIT and 500 BBL./DAY, 125# W.P. STABILIZING DESORBER

A NATIONAL "LTX® SYSTEM"

PER UNIT VOLUME OF WELL EFFLUENT PRODUCED

GIVES

❶ Maximum Stable Distillate Recovery

❷ Maximum High Pressure Gas Sales

❸ Maximum Trouble Free Performance

PLUS

The ability to operate with or without the injection of Glycol or other hydrate inhibitors.

It's National®

NATIONAL TANK COMPANY

TULSA, OKLAHOMA

7-11-53

Yes, it's Youngstown

THE EXCELLENT WELDING QUALITIES of Youngstown line pipe are evident on every job. Pipe line contractors who are becoming increasingly critical of pipe features which add to their costs welcome this easy-to-weld pipe.

YOUNGSTOWN
Electric Weld
LINE PIPE

Uniformly satisfactory in service because—

Long lengths save time and trouble

Weldability is outstanding

It bends readily

Line up characteristics are excellent

QUALITY YOUNGSTOWN SERVICE

Youngstown

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

PIPE AND TUBULAR PRODUCTS - CONDUIT - BARS - RODS - COLD FINISHED CARBON AND ALLOY BARS - SHEETS - PLATES - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RAILROAD TRACK SPIKES

We're drilling on Iron

to learn more about bearings

Bits are being run on heat-treated alloy steel blocks in the continuous and exhaustive bearing tests now in progress in the Hughes Laboratory. The steel blocks prevent the bits from making hole too fast, yet permit the stresses and irregular bearing loadings that occur in actual drilling to be simulated. In these tests, the bits are run under extreme loads and at specified rotary speeds, with drilling mud circulating through the drill stem.

Because all phases of the tests can be closely controlled and duplicated, we are provided with an accurate basis for measuring comparative results and for better evaluating bearing performance. This study is only one of many rock bit research projects in progress at HUGHES looking to the constant improvement of Hughes rock bits.